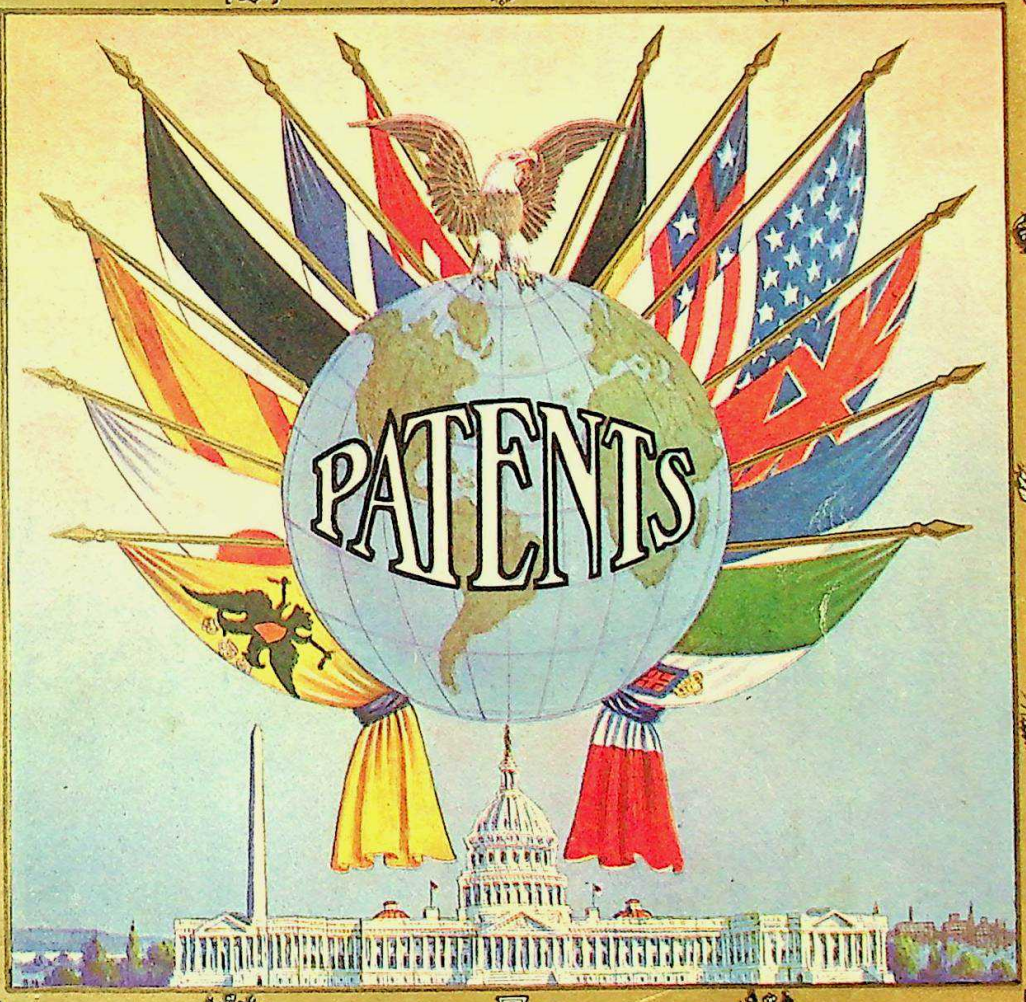
FOREIGN PATENTS



RANDOLPH & COMPANY
U.S. AND FOREIGN PATENTS
WASHINGTON, D. C.

WALLACE BALLFORD, SECRETARY
CLARENCE A. CANNON, CLERK

CHARLES R. CRISP
PARLIAMENTARIAN

THE SPEAKER'S ROOM
HOUSE OF REPRESENTATIVES
WASHINGTON, D. C.

August 20, 1912.

To Whom It May Concern:

It gives me pleasure to state that I am acquainted with the firm of Randolph & Company, patent attorneys, of this city, and believe them to be thoroughly reliable, capable and exceedingly well equipped to look after the interests of their clients.

They are entirely up to date in their methods and able to render efficient service to their clients.

Sincerely,

Champ Clark

Endorsement by the Hon. Champ Clark, Speaker of the House of Representatives.

What the Vice-President of the United States Thinks of L. F. Randolph & Co.

(*See next page.*)

THE VICE-PRESIDENT'S CHAMBER.
WASHINGTON.

OCTOBER 29", 1913.

TO WHOM IT MAY CONCERN,-

It has not been given to me to form the personal acquaintance of Randolph and Company, patent attorneys of this City, but as I have been frequently requested to recommend such attorneys to inquiring friends throughout the United States, it has become necessary for me to inquire with reference to the capacity and attention to business of this firm. I have learned that they are thoroughly up-to-date and have taken great pleasure in personally recommending them to inquiring friends.

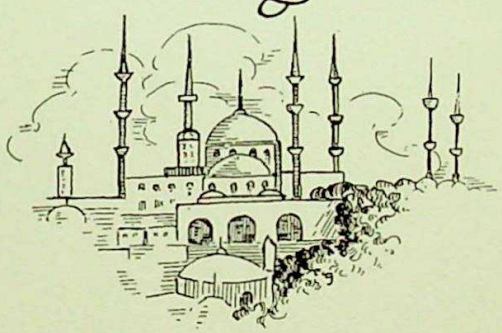
Respectfully,

Thos. R. Marshall

PATENTS

IN

FOREIGN COUNTRIES



BY

L. F. RANDOLPH & CO.
WASHINGTON, D.C.

1914

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ONE OF THE LOVELIEST SPOTS IN INDIA. KIOSK-BORDERED TANK AT WLWAR BY STATELY TOMB OF ROYALTY, INDIA.

PATENTS IN FOREIGN COUNTRIES

INVENTIONS worth patenting in this country are, with very few exceptions, worth patenting in from three to over fifty foreign countries and colonies.

The European demand for the more important American inventions and the products of them has always been large, as the success abroad of the Westinghouse air brake, the Bell telephone, the Brush arc light, the Thomson electric welding process and apparatus (the British patents alone on this said to have been sold for $1,250,000), the Edison incandescent light, phonograph and other inventions, and the success of many thousand minor inventions in Europe, can testify. Railways, steam and electric, light and power companies and the larger factories and farms not only in Europe, but all over the civilized world, are using devices and appliances, in many cases entire machines, invented and patented in this country by Americans. Some of these have protected their inventions abroad, with great resultant profit. More of them probably have failed to do so, leaving the foreigner free to make and use the product of their inventive intelligence. Failure to secure foreign protection has been a cause of regret to many American inventors or owners of American inventions that have proved their value after the issue of a patent here too late to obtain a valid patent abroad. The wiser sort now are seeing this and more foreign applications are being filed than ever before in the history of patent practice. In one case that we know of an inventor who has made a signal success of nearly

everything his brain has produced has filed applications on a group of four inventions in 33 foreign countries, making in all 132 foreign applications, which shows the faith of an experienced and highly successful inventor in the foreign patent field.

The reason for this is not far to seek. While valuable and meritorious inventions have come from France, Germany and England, American inventors have, on the whole, established their supremacy, not alone in the great number of their inventions, but in their quality and practical value, and foreigners have learned, in all departments of industry, to look to this country for new ideas. Many of these ideas, owing to the failure of the inventor to protect himself abroad, have been adopted and used the world over, without a cent of profit to him. It should be well understood that our courts can protect the inventor only against the manufacture, sale or use of the patented article in this country. A British vessel, for instance, equipped with a patented American capstan or swinging berth, can sail into New York harbor and stay there as long as it pleases without infringing the rights of the American patentee. It is probable that half the value, or more than half the value, of many thousands of American inventions have been thrown away by failure to protect the inventions in foreign countries.

Delay Should be Avoided.

Nearly all foreign nations grant patents to the first applicants, whether these are the actual inventors or not. Once the invention is disclosed to the public here, any person having knowledge of it can, if he desires to do so, practically steal most of the foreign patents, in which case the inventor has virtually no redress. This is a strong point in favor of taking up the matter of protecting the foreign rights as promptly as possible.

FOREIGN PATENTS

Latest Dates at Which Foreign Applications May be Filed.

In Canada applications may be filed at any time within one year after the issue of the United States patent. In Norway the additional time is six months. In Mexico the United States patentee has three months after issue of his United States patent to make application. Otherwise with the exception of Russia and some of the South American countries, the application must be filed before publication of the invention in the foreign country in question. Publication is considered to have taken place if any drawing, cut, model or description disclosing the invention has been made public in the foreign country. The receipt in the Patent Office of the foreign country of a copy of the Official Gazette describing the patent is considered to be a legal disclosure. Therefore, the filing of the foreign application, with the exceptions above noted, must be actually made in the foreign Patent Office in question before the Gazette can possibly have reached the foreign Patent Office. As all foreign Patent Offices correspond with the U. S. Patent Office and, as a matter of courtesy, exchange public documents, the Gazette is, of course, mailed on the same date as it is mailed to subscribers here. The only exception to this inflexible rule is the International Convention, which is in the nature of a continuing treaty between the powers which have subscribed to it.

The International Convention.

In the countries and colonies subscribing to what is known as the International Convention, where patent has issued in the United States, foreign application may be filed at any time before the expiration of twelve months following the filing of the application for the United States patent. These countries are at present:

Austria, Australia,

Belgium,	Mexico,
Brazil,	New Zealand,
Ceylon,	Norway,
Cuba,	Portugal,
Denmark,	Santo Domingo,
France,	Servia,
Germany,	Spain,
Great Britain,	Sweden,
Holland,	Switzerland,
Hungary,	Tobago,
Italy,	Trinidad,
Japan,	Tunis,

United States of America.

In regard to filing under the provisions of the International Convention, that is, after the issue of the United States patent, but before the expiration of 12 months from the date of filing the application in this country, we would state that this is inadvisable unless it cannot be otherwise avoided because in most countries there is an additional tax levied by the Patent Office or Bureau of each foreign country, or some additional requirements are made, necessitating additional expense, and to avoid this expense it is advisable to have the foreign applications filed before the patent issues in this country.

What Foreign Patents to Apply For.

This depends on the nature of the invention and its applicability to the climatic and industrial conditions in the countries under consideration. In a given case some countries would be entirely out of consideration, while in others the industrial and trade conditions might call strongly for the very invention in question. It is too frequently the case that attorneys themselves pay no attention to these considerations and are simply glad to get the client to make as many foreign applications as possible, irrespective of whether they are well selected or not. On this point you will find our service of great value to you. We keep fully informed on industrial conditions in every coun-

try with which we deal and have a large amount of special information in addition. In advising you as to selection of countries in which to patent your invention we reject in nearly every case a considerable number because we feel that in these countries it would be wholly unnecessary for you to take out patents in order to give yourself full foreign protection. For instance, if you have invented an important improvement in mining machinery it would not be necessary for you to obtain patents in the South American countries, although a good deal of mining is done there. None of the South American countries have plants adapted to make such machines nor are they likely to have such plants. They buy such things and a great many others from the United States or from some one of the manufacturing countries of Europe. Therefore, patents in the manufacturing countries for such an invention would give you substantial protection in South America and everywhere else in the world. Our service in this line is quite complete and without cost to you, and we sincerely desire to save you money and help you expend what you do expend on foreign patents to the best possible advantage. A satisfied client is the best advertisement we can have.

Selling Foreign Patents.

We have foreign correspondents of reputation and experience who are willing to undertake the sale of patents that seem to them meritorious, in foreign countries.

There are other reputable agencies, both here and abroad, which are also willing to undertake such transactions. Many such sales have been made. The business of selling patents or advertising to do so was at one time in dispute on account of the operations of certain so-called agencies which never sold patents, but were worked simply to get a small fee out of the inventor. At the present time, however, respectable and reliable concerns are found in the business of handling foreign patents. These do not usually expect an advance fee.

Foreign Patent Office Procedure.

The United States Patent Office examines the drawings, specification and claims, particularly the claims, in each application with special reference to novelty, though the examination is also strict as to the form and language of the specification. The French Patent Office, on the contrary, does not examine as to novelty at all. Examination is confined to determining whether the invention is of a class not patentable and whether the application is in proper technical form. Among the leading countries which follow the American system are:

Austria,	Russia,
Germany,	Denmark,
Norway,	Japan,
Canada,	Sweden,
Great Britain,	Australia.

Among those which follow the French system are:

Argentine Republic,	France,
Belgium,	Hungary,
Brazil,	Mexico,
Switzerland,	Spain.

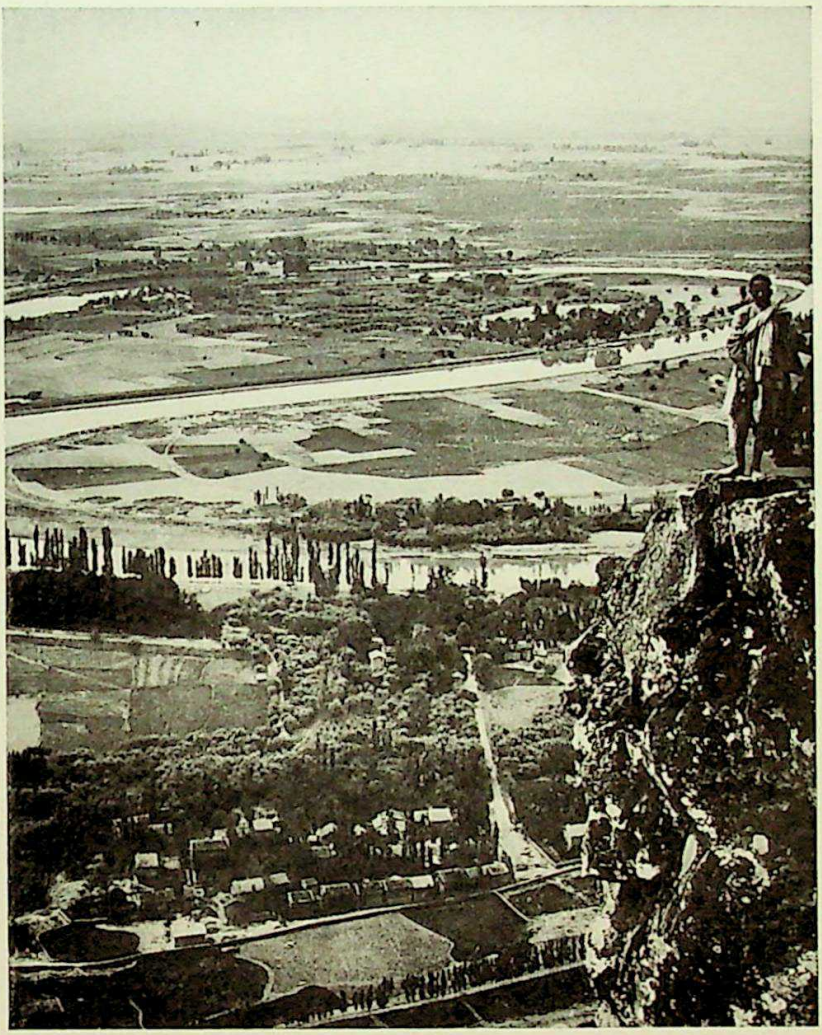
In Switzerland there is an examination for novelty, but the patent must issue if insisted on by the inventor.

It is probable that other countries will shortly adopt the American system of examining for novelty. It is within a comparatively recent time that Great Britain has done so.

Renewal Fees.

All the countries in the above list, except Canada and Mexico, impose a small annual tax or renewal fee on patents. This tax is a gradually increasing one from the second year (in most countries) to the end of the last year. In Great Britain the

FOREIGN PATENTS



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AN EARTHLY PARADISE—THE WORLD'S FAMOUS VALE OF CASHMERE, WATERED BY WINDING JHELUM, INDIA.

patent issues with all taxes paid to the end of the fourth year. In Australia the patent issues with all taxes paid to the end of the seventh. In other countries the patent issues with taxes paid for the first year. In France the yearly tax or renewal fee does not increase with the age of the patent, but remains stationary.

Working.

Working the invention within a certain specified time limit, which varies in different countries from two to five years, is required by the general patent laws of all the foreign countries above named, except Mexico. By treaty, citizens of the United States owning patents in Germany are not obliged to work their inventions. Working is not required in the United States and under treaty the two countries are obliged to give equality of privilege. Working means actual commercial use of the invention in the country which requires the working, but a working that will satisfy the law can be effected at small cost through our correspondents in all the leading countries, with the possible exception of France.

Exposure and Opposition.

In most of the European countries, whether applications are examined for novelty or not, they are placed on public record (exposed) for a period of time in order to give any person interested an opportunity to oppose a grant of the patent. This is not a bad thing for the inventor. It is better, if a contest is going to come up, that it should come up at that time rather than later. Opposition, if made, is a regular legal proceeding in which both sides have a full and very fair hearing. Opposition is rarely made, but when it is the whole contest can usually be conducted by correspondence without any great expense.

Foreign Protection for American Patentees.

Foreign laws, especially the laws of European countries, favor and protect the patentee to a considerably greater extent than

do the laws of the United States, and it is fair to say that by the courts of most European countries the patent laws are fairly and impartially enforced. The cost in such proceedings as the patentee may find necessary is frequently less than it would be in a similar proceeding in the United States.

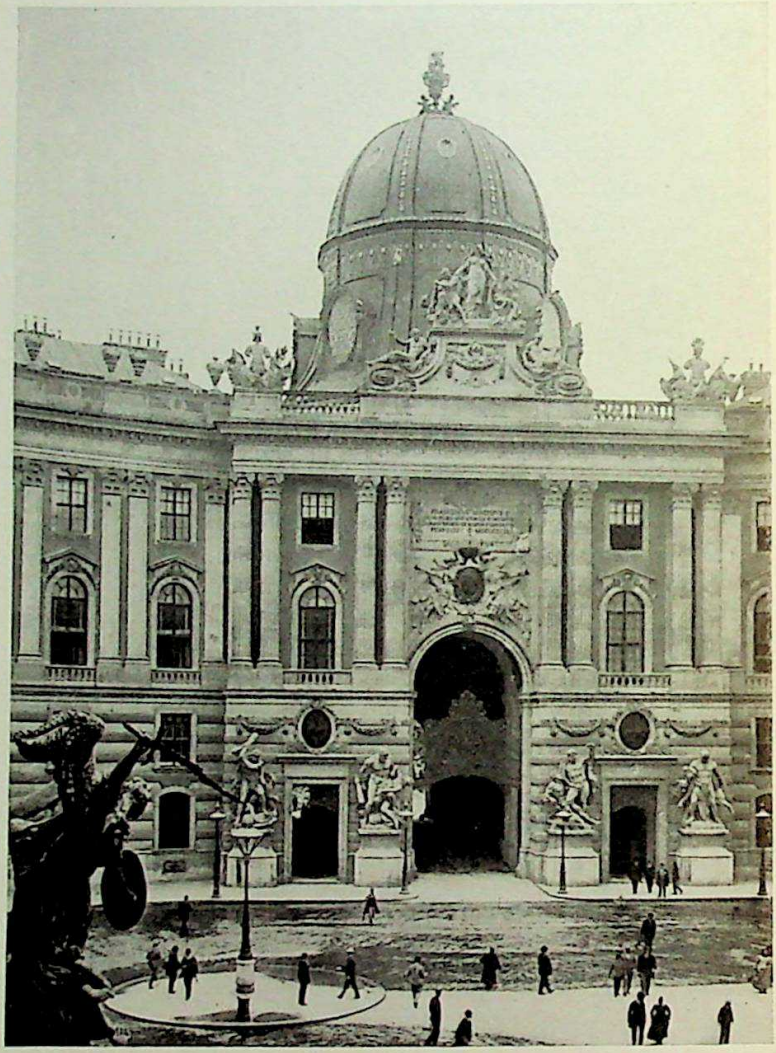
Another thing which greatly favors the inventor is the fact that the court in construing his invention and determining its scope does not confine itself to the claim or claims. It is universally true throughout Europe that the courts endeavor to gather from the specification just what the invention actually is without very much regard to the claim or claims, though these latter are, of course, considered. This is a distinct advantage to the American inventor with the foreign patent. He is sure that he will not be defeated by any narrow or technical construction of a claim. In this he is better off than he would be in the United States.

In the Argentine Republic, Austria, Brazil, Denmark, Chile, France, Germany, Hungary, Italy, Japan, Mexico, Norway, Russia, Spain, Sweden and Switzerland, and in a number of less important countries, wilful infringers are not only liable for civil damages, but to fine and imprisonment under the criminal law. In Germany, Austria, Hungary and Japan the question of validity cannot, as here, be raised in an infringement suit. Validity can only be questioned in a suit to annul the patent. A patent is incontestable on the question of novelty after two years in Russia or after five years in Germany.

Foreign Patents---Legal Points.

The term of nearly all foreign patents runs from the day the application is filed and not from the date of issue, as in the United States.

To insure absolute safety, foreign patents should be applied for before any disclosure of the invention here, except as it is necessarily disclosed, in confidence, to a patent attorney, drafts-



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GRAND PORTAL, IMPERIAL PALACE, VIENNA, AUSTRIA.

man, model maker, trustworthy witnesses or partners, and, of course, to the Patent Office. Canada may be again excepted, as the inventor's rights are there preserved as above stated, and for the reason that he, or his legal representative, is alone entitled to a patent.

In Canada actual manufacture must be begun within two years, and must be continued to such an extent as to render the invention accessible. In most other countries a nominal working that can be made at low cost through our agents will satisfy the law. In Germany working is not required from patentees who are citizens of the United States. Working is not required in Mexico.

German patents protect the invention in all the German colonies. The same is true of French patents.

British patents cover the British Islands only. Each British colony has its own patent system and issues patents through a patent office of its own or through a department of the colonial government designated for that duty.

It may be stated in this connection that United States patents do not cover colonial possessions, such as the Philippines. They can be made to do so by registration, for which a small fee is charged. The Hawaiian Islands and Alaska are territories, not colonial possessions, and are, therefore, covered by the United States patent.

Our Methods and Terms.

The valuable suggestions we can give you as to what foreign patents you should apply for and as to what you should omit we give without charge. If you are limited by circumstances as to the number you are able to make application for we can tell you in the order of their value for your purposes what are best and we can and do tell you the facts on which we base the advice.

In all foreign applications in which we fail to obtain a patent, where we have advised the application, we return, exactly

as we do in U. S. cases, our attorneys' fee for the preparation and prosecution of the case. This usually amounts to about $20.

Where three or more foreign applications are made through us on the same invention and at the same time we make a substantial discount from the figures of cost for each country included as the same are given below.

The cost for each country as quoted is in full (subject to disin simple cases calling for a single sheet of drawing and not count as above) covering all attorneys' and Government fees more than the usual number, 1,000 words, if the same are translated into a foreign language. In other cases we can inform you, having the United States application already in our office, as to the exact cost of any foreign patent.

It sometimes happens that the inventor of a valuable machine, device or process, for which there may be a ready foreign market, perhaps in a number of countries is unable for lack of immediate funds to secure his foreign protection. Such foreign protection in many cases would enable him to more than double his profits, and in occasional instances his protection in a single foreign country might be worth even more than his United States patent by reason of the peculiar nature of the invention and its adaptation to special conditions obtaining in the foreign country. In such case it is well for the inventor to apply to some person of means whom he personally knows to advance the amount necessary for proper foreign protection in consideration of a fractional interest in the foreign rights. We have carefully prepared and send with the notice of filing of the U. S. application a form of contract especially adapted for this purpose which protects both parties completely. It is often difficult in such cases to find a person in the neighborhood competent to draw such contract. With this contract and our guarantee to refund attorneys' fees in case of failure to obtain a patent or patents the person advancing the money has considerable protection.

When you have selected the foreign countries in which you

intend to file applications send us $10 on account for each case. We will then prepare and forward the formal papers for signature. On receipt of these, duly signed, and of the balance of our charges as may have been agreed upon, we will at once forward the cases and will promptly notify you of the filing of the same.

Why You Should Send Us Foreign Patent Business.

Our standing and reputation as shown by the high endorsements which we furnish is of itself sufficient. We know how to do this line of professional work with particular efficiency, bringing to it experience and long and careful study of foreign patent law.

We have accumulated a large fund of valuable information, much of it exclusive, as to the industrial situation in various countries, as to what inventions are needed, as to where to file applications.

We have a competent staff employed and equipped for this very purpose.

We show you, if necessary, how to obtain the backing you may need to take out your foreign patents and we assist you to that end through our contract forms and also with practical suggestions.

And we can give you intelligent advice and in many cases practical assistance in finding a market.

Do not neglect or underrate the foreign market for your invention.

Do not overlook the fact that the civilized countries of the world outside the United States contain more than 300,000,000 highly civilized people whose wants in transportation, industry, agriculture and in things which minister to the convenience and comfort of life are substantially similar to our own.

Do not overlook the further fact that there are many hundred millions more not yet educated to our standard of living, but whose wants, even as far as they have developed, call for the products of American invention and that many of these are rapidly rising toward a higher civilization, with all the wants it implies.

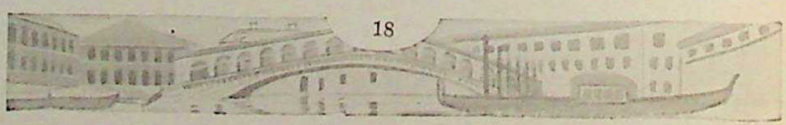
Take up the matter of foreign applications when you receive the notice that your United States application has been filed. Nothing is gained and much may be lost, by delay. You will need time in which to consult with us, to make up your mind in what foreign countries you wish to patent your invention, and frequently time in which to make your financial arrangements.

Beside the information given in this booklet we can assist you materially in the selection of the best countries in which to file applications, and can always give them to you in order of preference. We are well informed on the industrial and trade conditions which bear on the advisability of taking out a patent in any special country, and we keep our information fully up to date. We make a specialty of this service, and we believe we can give you the best that exists, without cost to you.

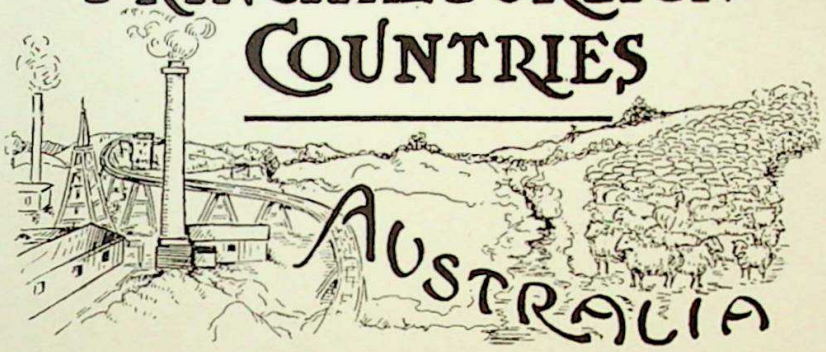
We emphasize the above point because mistakes are frequently made, through the ignorance of attorneys or that of their clients, in selecting foreign applications, both in filing in countries which do not, on account of certain climatic or industral conditions, need the invention and in omitting other countries in which the invention would be useful and profitable.

Do not fail to take advantage of our service on this point. It will save you money.

Except in a few countries, to be noted hereafter, no valid patent can be obtained unless the application is filed either before the issue and publication of the U. S. patent or before the expiration of twelve months from the date of the U. S. application.



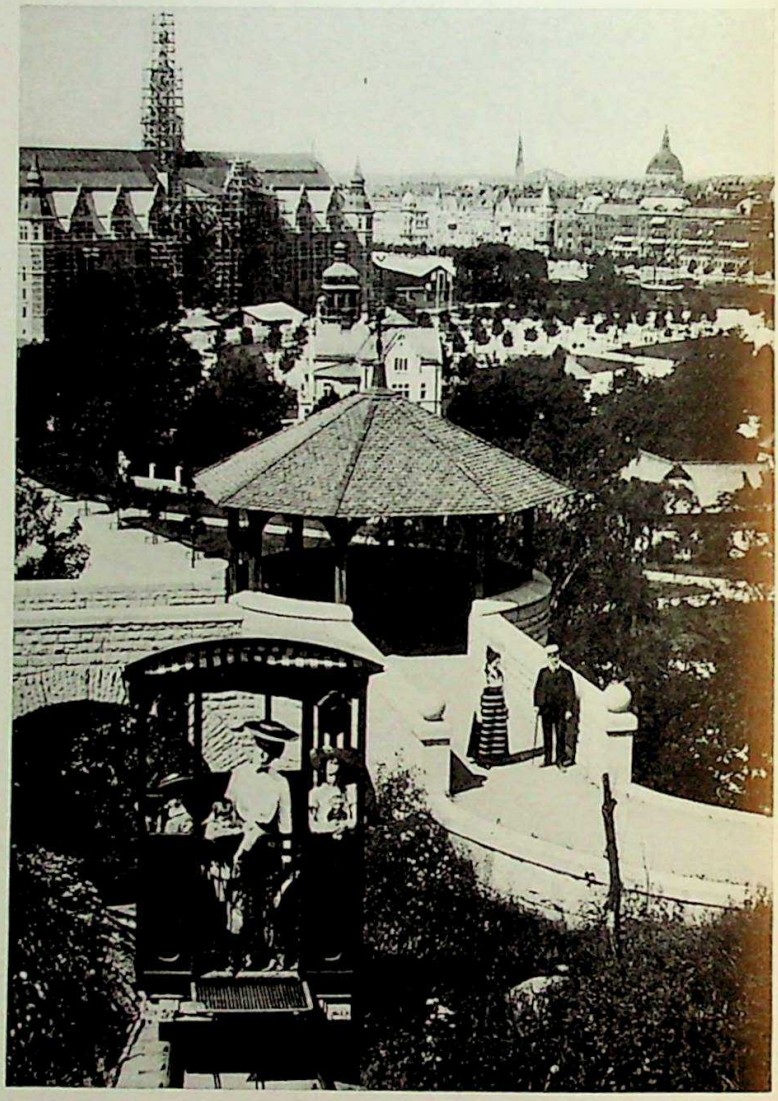
PRINCIPAL FOREIGN COUNTRIES



Australia, while a British colony, is practically self-governing. It is an enterprising and prosperous commonwealth of five states, formerly separate colonies, but now united into the Australian Commonwealth. The population is a little under 5,000,000 and it has about 17,000 miles of railroad. It is, next to Canada, the most prosperous of all the British colonial possessions and full of the spirit of enterprise. It has large and well-built cities with electric railways and every modern improvement. Its agricultural resources are very great. It exports annually about 40,000,000 bushels of wheat, besides supplying the home market. It is one of the largest producers of wool in the world, the wool being of particularly high grade. Its mining industries, gold and copper particularly, show a large annual production. It is well supplied with coal. It is a large exporter of hardwood lumber of a very high grade. Of late years its manufactures, which were comparatively small up to the opening of the century, have increased with great rapidity.

A great many American inventors have considered it advisable, and some have found it profitable in a high degree, to take out Australian patents, even in the days when, in order to cover Australia, five patents, one for each colony, had to be taken out at an expense of about the same for each one of the five as the patent for the Commonwealth under the present organization. It is certainly a better field now than it ever has been.

The total cost of an Australian patent is $90. The term is 14 years. The patent as issued is paid up to the end of the seventh year. A charge of about $40 is made for the last seven years.



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THE CITY OF STOCKHOLM, WEST FROM THE WOODED HEIGHTS OF SKANSEN, SWEDEN.

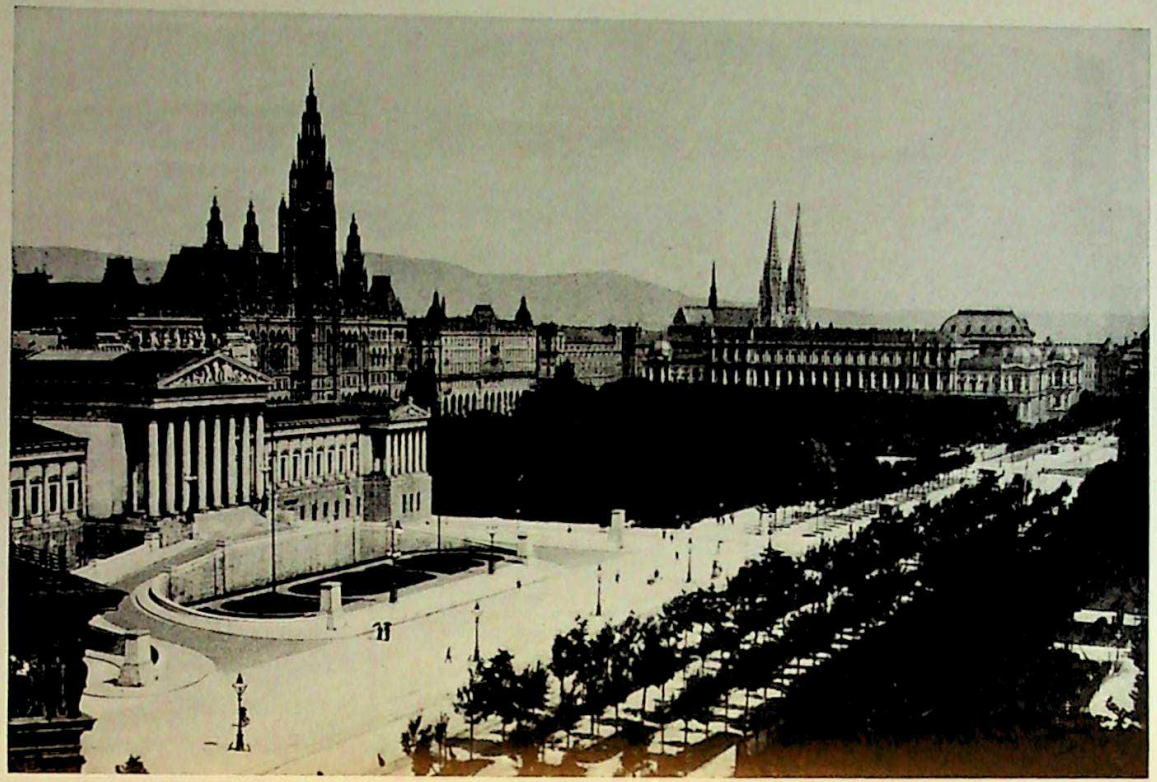
ARGENTINE REPUBLIC

The Argentine Republic is an enterprising and prosperous country. Its population of 7,000,000 is very largely of the best European stock. Buenos Aires, the principal city and seaport, will compare in construction with any American city and has a very large commerce, its docks being among the finest in the world. The Republic has a railroad mileage of about 13,000. The cities and many of the larger towns are equipped with electric railways.

As compared with the United States, the Argentine Republic has about the same climate, and for that reason its agriculture and products are and can be made substantially the same. A great deal of American and European money is being used to develop its resources, so that the country has a bright future. In area and population this country is second largest in South America, being second to Brazil, and has the advantage over Brazil of being situated almost entirely in the South Temperate Zone, while Brazil is nearly all in the Torrid Zone.

The natural resources of the Republic are very great. It is a large exporter of wheat, which is raised on large farms using the best available farm machinery. Its main exports are wheat, frozen or preserved meat and some wool. An inventor who has perfected anything of use on the farm, railway or in electric or oil lighting or any minor invention of general personal use, should consider the Argentine Republic.

The patent law is peculiar, in that patents are issued for five, ten or fifteen years and must expire at the end of the term for which they are issued. If the applicant applies for a five-year patent it expires in five years, with no privilege of extension; so with the ten-year patent. The cost of a five-year patent is $100, of a ten-year patent $130, and of a fifteen-year patent, $190.



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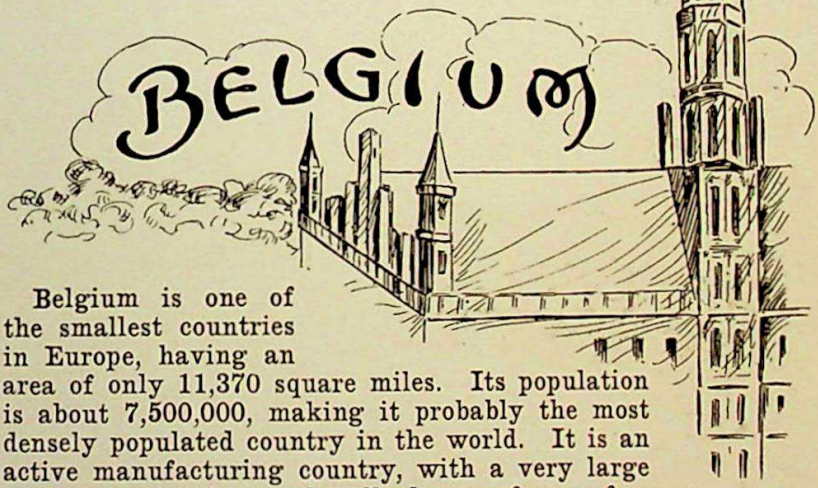
THE FRANZEUS RING, VIENNA

AUSTRIA

Austria, not including Hungary, has a population of 28,000,000. Its manufactures are numerous and about as diversified as those of the United States, particularly in the line of metal products. Other leading lines of manufacture include pottery and glassware, which are exported to a value of $10,000,000 or $12,000,000 a year, and jewelry and silverware for which the artisans of Austria are famous. It has large agricultural resources, and is a good market for labor-saving machinery and devices both for the mill and the farm.

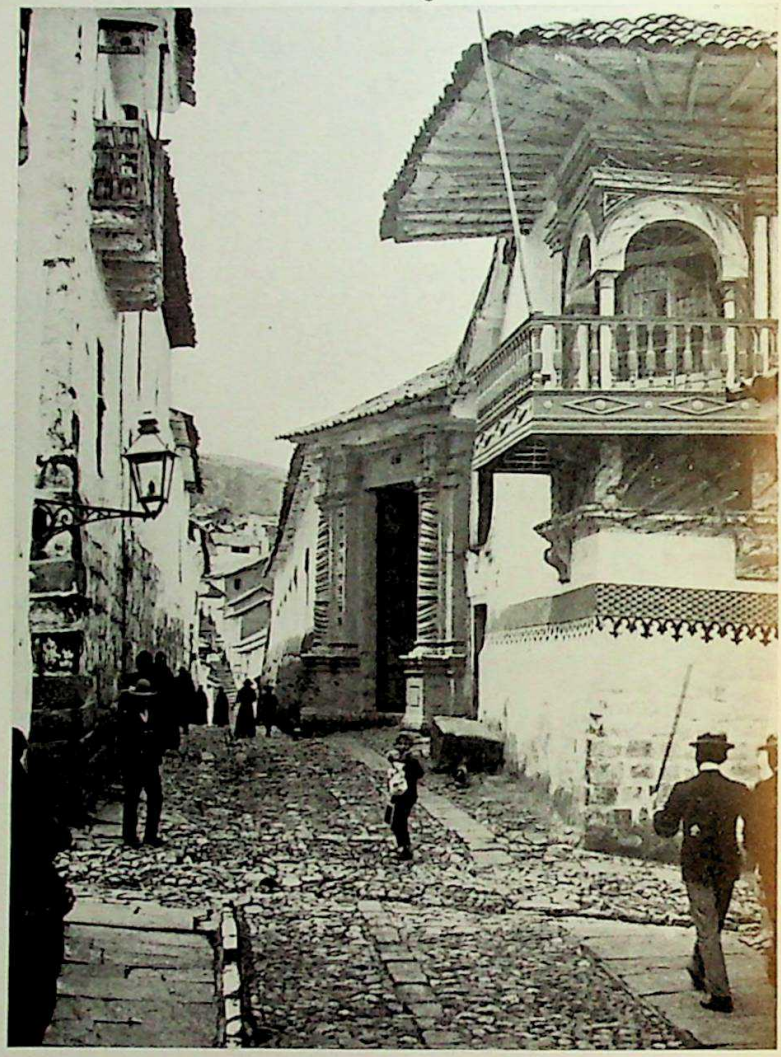
The cost of an Austrian patent paid up to the end of the first year is $70. There is a small annually increasing tax after the first year.

BELGIUM



Belgium is one of the smallest countries in Europe, having an area of only 11,370 square miles. Its population is about 7,500,000, making it probably the most densely populated country in the world. It is an active manufacturing country, with a very large annual output in nearly all classes of manufacture, particularly metal working. As a general thing, any invention that it is advisable to patent in England or Germany should be patented in Belgium.

The term of a Belgian patent is twenty years, with a small increasing annual tax. The cost paid up to the end of the first year is $40.



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TYPICAL ARCHITECTURE—SPANISH AND INCA STYLES—CALLE DE TRIUMFO (TRIUMPH ST.), CUZCO, PERU.

BRAZIL

Brazil is the largest country territorially in South America and also has the largest population, 20,000,000. It is also undoubtedly the richest of all in natural resources. It has a vast extent of territory which is well adapted for farming on a large scale. The demand for agricultural machinery is already considerable. Its great export crop at present is coffee, but the country is adapted for the production of anything that will grow in a tropical climate, while the highlands are adapted for crops that can be raised in the southern temperate countries of the Northern Hemisphere.

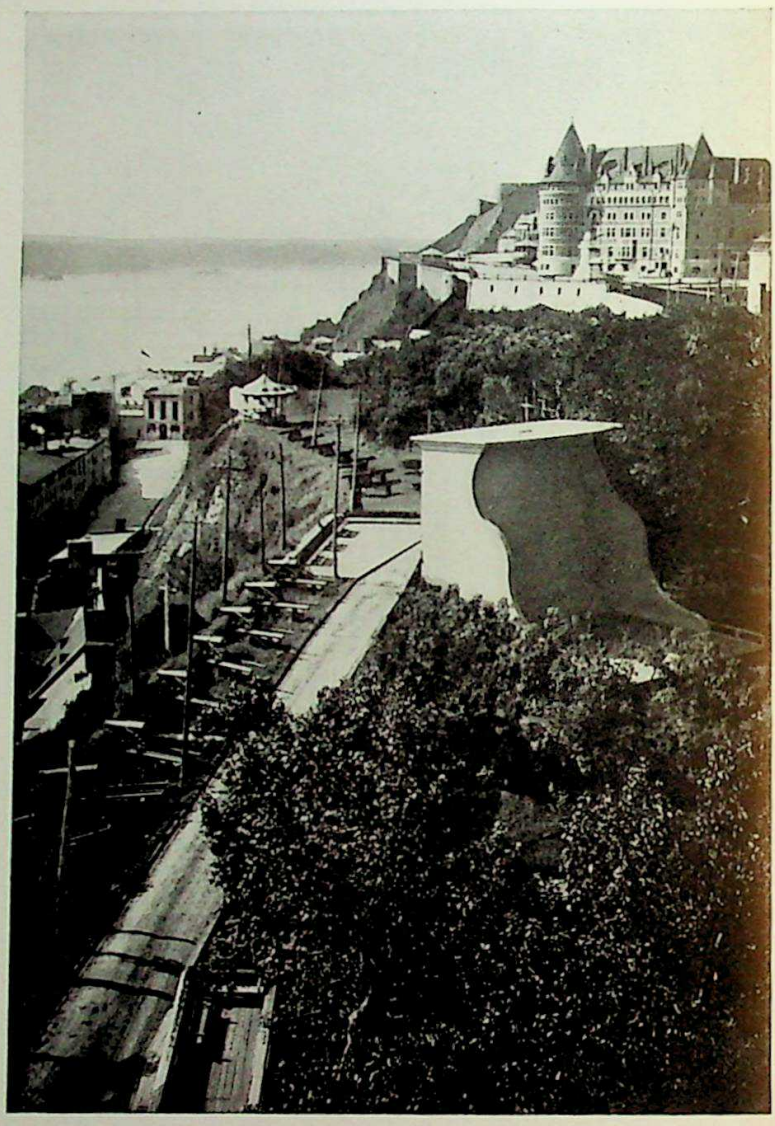
Brazil is rapidly developing in mining and agriculture of all kinds. The most important products, in addition to coffee, heretofore mentioned, are timber for shipbuilding and cabinet work and woods for dyeing, also tropical fruits, cotton, India rubber, tobacco and grain. Cattle raising is also an important industry.

Inventions relating to the cultivation, harvesting and shipment of these agricultural products would be important subject-matter of patent protection in this country. Mining machinery of all kinds will doubtless be extensively demanded in the immediate future.

Brazil is also rapidly developing in social and domestic lines, and inventions relating to household and kindred subjects, transportation and amusements, are in active and increasing demand. The American inventor is always ready to supply any demand, so that Brazil should be considered in making lists of countries in which to seek protection in the lines indicated.

The country has attracted a very high-class of European immigration, the greater portion of which is German. In portions of the Republic the German element preponderates in numbers over the natives. The country is peaceful and is undergoing a very rapid industrial development. The laws are liberal and well administered. They favor and protect the patentee and hold the infringer to a criminal as well as a civil liability.

The cost of a Brazilian patent is $120. That pays all fees up to the end of the first year, after which there is a small annual tax, increasing year by year.



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ROMANTIC OLD TOWN AND FROWNING CITADEL, QUEBEC—VIEW UP ST. LAWRENCE FROM LAVAL UNIVERSITY.

CANADA

Canada is larger than Brazil in extent of territory, having more than any Republic or colony, except the United States, in the Western Hemisphere. It is having a tremendous growth. The immigration both from Europe and the United States has been going mainly to the Canadian Northwest, from which the demand for agricultural machinery and tools of all sorts is considerable and shows a large yearly increase.

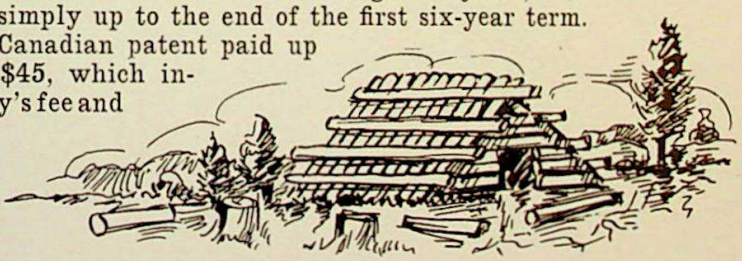
Canadian manufactures are also increasing very rapidly, manufactured products running over $600,000,000 a year. There is a sharp demand for labor from manufacturers.

Manufacturing is greatly favored by the abundance of water power at Sault Ste. Marie, and at Niagara are two tremendous power plants already in operation. It is estimated that from Sault Ste. Marie to the Lachine Rapids above Montreal there is water power enough to furnish 10,000,000 horse power.

Industries in Canada are becoming almost as much diversified as they are in the United States, and it is safe to lay down the general rule that an invention that is useful and valuable in the northern part of the United States is amply worth patenting in Canada.

The patent law and Patent Office practice follow those of the United States very closely. The actual inventor must make the application, which is not the case in most other foreign countries. Canadian patents are granted for six years, renewable for two successive terms of six years each. As no advantage is gained by payment in advance for the whole eighteen years, it is advisable to pay simply up to the end of the first six-year term.

The cost of a Canadian patent paid up for six years is $45, which includes our attorney's fee and one sheet of drawings. The renewal fee is $20, alike for the second and third terms.



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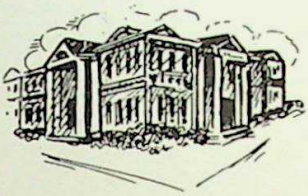
PALACE SQUARE (CENTER), CATHEDRAL (RIGHT), CUSTOM HOUSE TOWER (LEFT), SOUTHWEST FROM CABANA, CUBA.



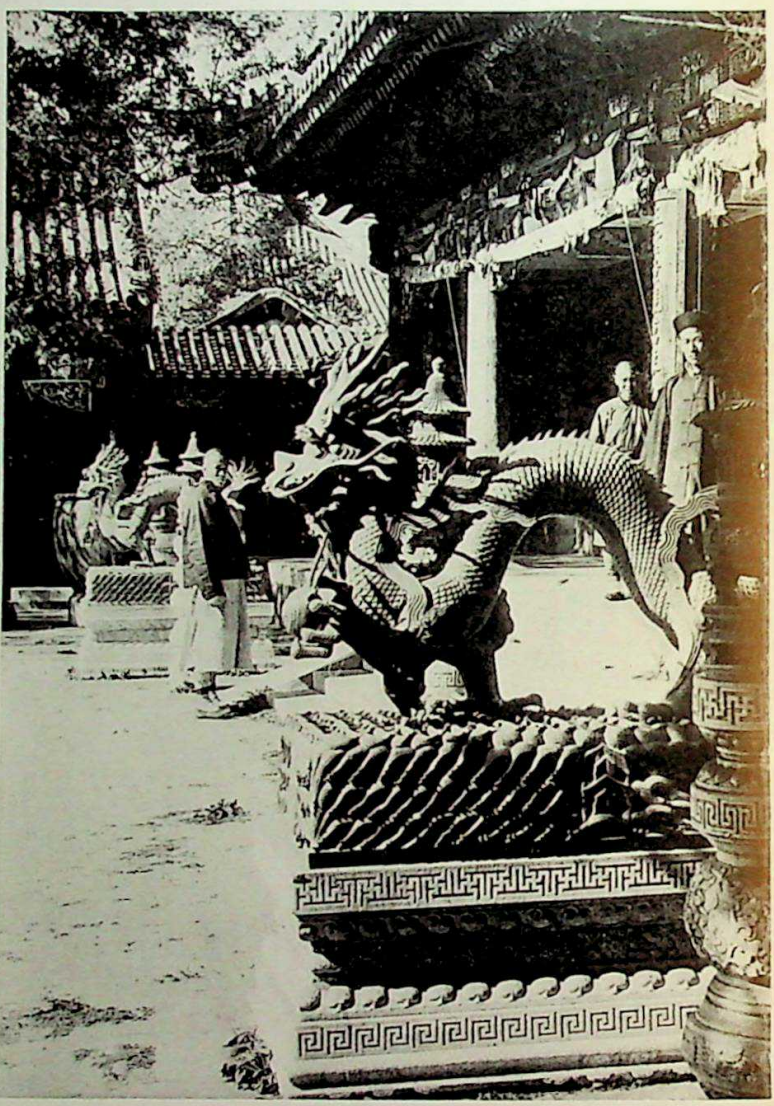
Chile

Next to the Argentine and Brazil, Chile is the most enterprising and prosperous of the South American Republics. It has a population of over 3,000,000, with a railroad mileage of 3,300. It has well-built cities, equipped with everything that American cities have in the way of lighting and transportation. It has practically no manufactures. What manufactures there are are on a comparatively small scale and for local purposes. The chief export is nitrate from the nitrate beds which Chile won from Peru in the last war between those Republics. The largest items in its imports are tools, machinery and metal products of various kinds.

The entire cost of securing patent in Chile is $180. There are no taxes or renewal fees. Working is required within one or two years, fixed by the Government. The duration of the patent is also fixed by the Government when granted, subject to extension.

CUBA

Cuba has a population of 2,000,000. As is generally understood, the two principal industries are raising and preparation of tobacco and sugar. Cuba is, however, adapted for any form of tropical farming. Tools and machinery for the cultivation and manufacture of sugar and tobacco should be patented in Cuba. In view of our trade and political relations with Cuba, American inventors are sure of full protection. The total cost of a Cuban patent, for 17 years, is $100, including all fees.



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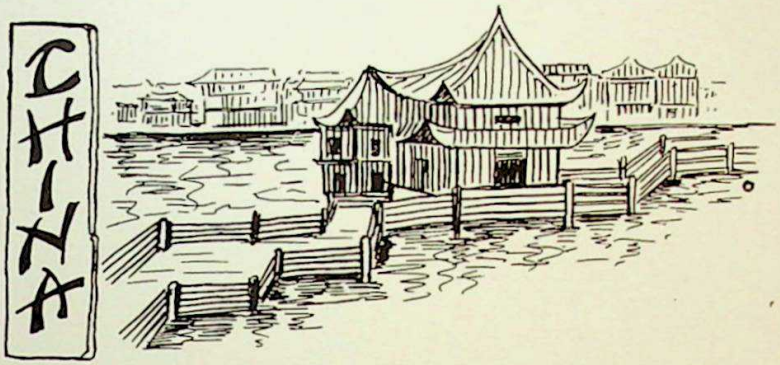
HOME OF THE WORLD'S MOST REMARKABLE RULER—ENTRANCE OF PALACE OCCUPIED BY CHINA'S FAMOUS EMPRESS DOWAGER—FORBIDDEN CITY, PEKING.



China is now a Republic. No patent law has yet been passed, but such a law will certainly follow within the next year or two. Pending its passage satisfactory protection can be obtained by registration of the American patent. The cost of such registration is now $75. It is altogether probable that when the Chinese Republic enacts a patent law such a registration will not only be recognized, but that little or no expense will have to be incurred in converting the registration into a full patent.

China has a population, partly estimated, of 426,000,000. It has 4,840 miles of railway, and the expansion of railway lines is going on quite rapidly. It has a fine system of internal water transportation on its two great rivers, a very large amount of water power and an abundant supply of coal and petroleum. It has hitherto been largely—in fact, almost wholly—an agricultural country, manufacturing by primitive methods comparatively little beyond its own needs, though Chinese silks have been known in the markets of the world for many years. But it is well adapted to become a great manufacturing country, and it is believed that the next few years will see the establishment of many large manufacturing plants in China. China should not be overlooked by any American inventor who has perfected improvements in tools adapted for small farming or the simpler sort of household conveniences, and the time will very shortly come when there will be a demand in China for improvements in textile and metal-working machinery.

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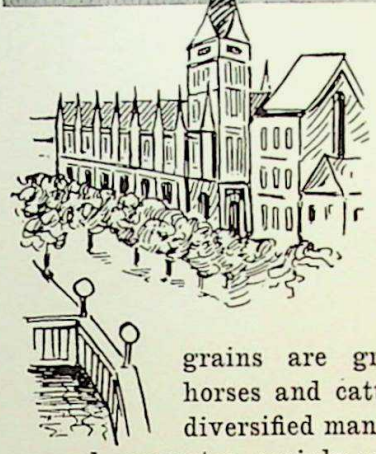
THE GREAT ASSUAN DAM, NORTHWEST FROM THE FIRST PYLON OF THE PHILAE TEMPLE, EGYPT.



Denmark

Denmark is a small but exceedingly prosperous country, largely agricultural. Wheat and other grains are grown and the raising of sheep, horses and cattle is carried on. It has, however, diversified manufactures, principally dairy machinery and apparatus, mainly supplying its own needs.

It has a population of 26,000,000, and its railway mileage is 2,100.

The cost of a patent is $65 paid up for one year. There is a small increasing annual tax during the remainder of the term, which is fifteen years.

EGYPT

In Egypt, as in China, the only protection that can be obtained is by registry. But this has all the force and effect of a patent and, as Egypt is substantially in the control of Great Britain, the patentee registering there can rely on fair dealing in the courts. The population of Egypt is 11,300,000.

Considerable farming is done on the same large scale as in Northwestern Canada and parts of the United States. A great deal of cotton is produced. There is no manufacturing on a scale sufficient to justify applications for patents for improvements in machinery otherwise than agricultural. Improvements in small labor-saving devices for household use might find a market, as the general condition of the people, which has been very low, is rising.

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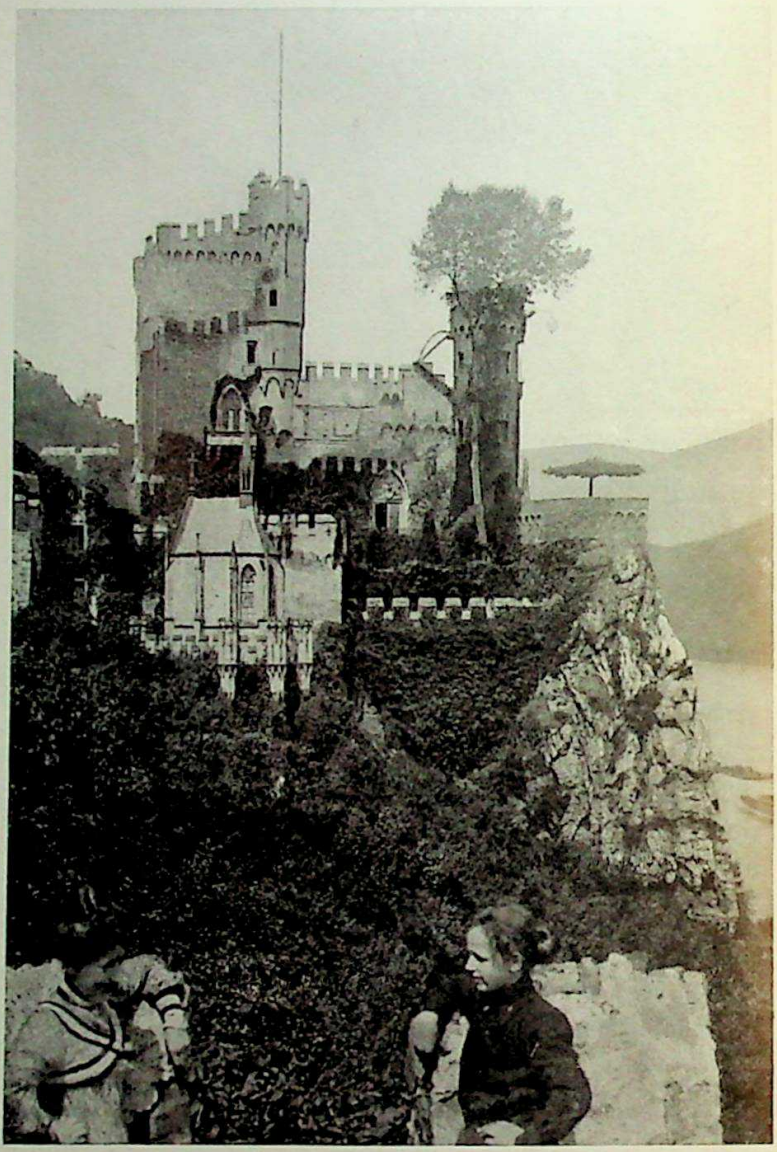
ARC DE TRIOMPHE—PARIS.

FOREIGN PATENTS

France has a population of about 40,000,000, with a railroad mileage of 25,000. It is probably the leading nation of Europe in the finer metal and textile products and in articles of luxury generally. France virtually created the automobile, in that French manufacturers produced the first practicable machines, and certain makes of French automobiles still command the highest prices. French mechanicians and machinists are considered the most skillful in Europe, and have, first and last, made a good many valuable inventions themselves. French manufacturers are enterprising and disposed to take up anything new that pleases them.

The principal minerals are coal, iron, silver, lead, copper, antimony, manganese, arsenic, bismuth, and gypsum. The country abounds in porcelain clays, mill and building stones. Inventions which relate to the treatment of, or operations upon, any of these materials, should meet with popular demand. Textiles, watches, jewelry, pottery, chemicals, instruments of precision, fine arts and music are highly developed, and any improvements in these lines are eagerly investigated and, if meritorious, are promptly purchased and utilized. Fruits of the semi-tropical class grow in the greatest abundance, and the wines of Champagne, Burgundy and Bordeaux are renowned throughout the world. Processes of treatment in the arts of distilling, brewing, wine making and packing, aging, shipping and general care of spirits, find ready adoption if of real merit.

France is one of the three best foreign markets for American inventions. The French patent covers France and all its colonies and costs $65. There is a small annual tax, not increasing. The term is fifteen years.



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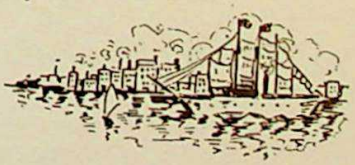
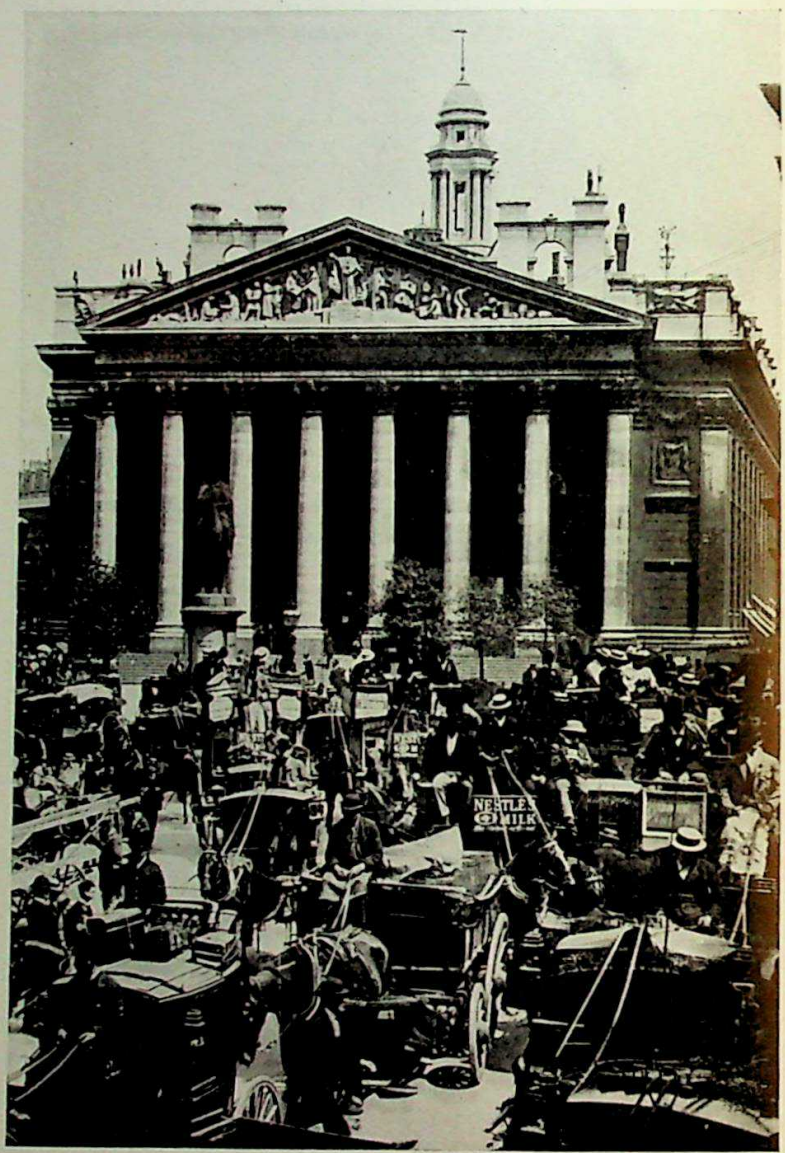
THE RHEINSTEIN, MOST PICTURESQUE OF RHENISH CASTLES—GERMANY (WHERE CEMENT MAY HAVE BEEN USED).

Germany, with almost exactly the same area as France, has approximately 62,000,000 population. Next to Great Britain it is the great manufacturing country of Europe, and as an exporter of manufactured goods it has been yearly cutting down Great Britain's lead. The country is a hive of manufacturing industry as diversified as in the United States. Inventions which would be valuable in the United States would be valuable in Germany. This is not true of agricultural inventions for some are adapted to use in raising or harvesting crops which are not grown in Germany or anywhere in Europe, but in the main it applies.

Any person may make application for a patent, whether he is the inventor or not. Applications are very carefully and stringently examined for novelty. On many improvements for which patents are easily obtained in the United States a full German patent cannot be had, the examination looking somewhat toward the question of broad usefulness. On specific improvements we can obtain what are termed "Model" patents (Gebrauchmuster). These are easily obtained and run for three years, with the privilege of renewal for three years more. In most cases they are well worth taking out. These cases are usually clearly distinguishable by a competent attorney, familiar with the German patent law and Patent Office requirements, from those in which he is justified in applying for a full patent.

The cost of a German full patent paid up for the first year is $65, with a small increasing tax after the first year. The term is fifteen years. The cost of a "Model" patent for three years is $35 and for renewal for three years more $30. There is no annual tax on a German "Model" patent. A German patent covers the German colonies.





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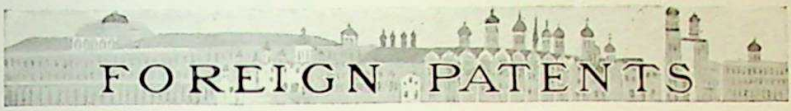
ROYAL EXCHANGE, LONDON, ENGLAND.

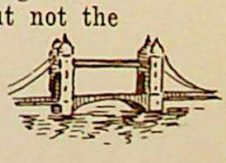


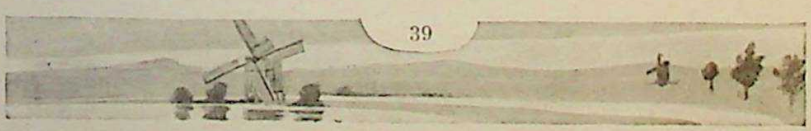
GREAT BRITAIN

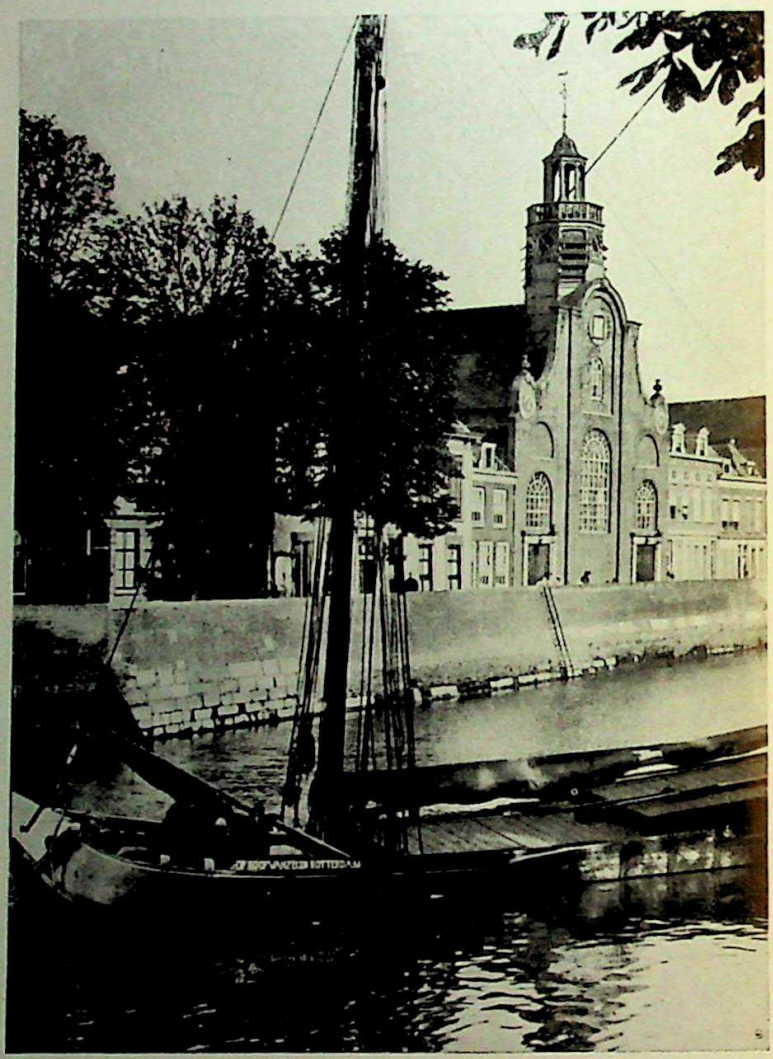
In finance, trade and manufacturing Great Britain leads the rest of Europe, with Germany second. The same is true of foreign commerce. Great Britain is not only the largest exporter in the world, her exports reaching the stupendous total of over $5,000,000,000, but these exports nearly all go to their destination in ships built and owned in England. The bulk of British exports are manufactured goods. Great Britain is the best market for mechanical inventions and improved methods of manufacture outside of the United States. London is the financial center of the world and patents for inventions of distinct merit taken out in other European countries have frequently been sold in London, and sometimes can be sold to better advantage there than in Paris or Berlin. Most inventions that are useful and valuable here should be protected in Great Britain, and should produce there results satisfactory to the inventor.

Patent Office procedure is now similar to that of the United States and Germany, except that the examination for patentable novelty is confined to British patents and goes back not over fifty years. The patent is granted to the inventor, the "communicatee" (first introducer), or the assignee. The expense of an assignment is considerable and can be avoided by having the assignee sign the application.

The British patent runs for fourteen years. Taxes begin with the fifth year. The patent covers Great Britain, but not the colonies. The cost, including our fees, is $65. The courts incline to liberality in the construction of patents and the determination of inventors' rights under them.







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CHURCH AT DELFTHAVEN, WHERE THE PILGRIM FATHERS PRAYED BEFORE EMBARKING FOR AMERICA, HOLLAND.

HUNGARY

Austria and Hungary are one Empire, but have separate Patent Offices and slightly different patent laws. Hungary has a population of 20,000,000, very largely agricultural. There is a great deal of farming on the large scale that we are familiar with in this country and American machinery is already in use on many of the large wheat farms. There is a good market for improvements in such machinery and for all descriptions of household and farm conveniences. The people are intelligent and accustomed, especially in the cities, to thoroughly modern and up-to-date living.

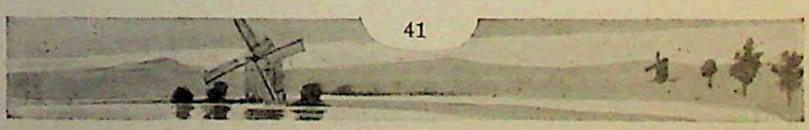
The cost of a Hungarian patent is $70 paid up to the end of the first year. There is a small increasing annual tax.

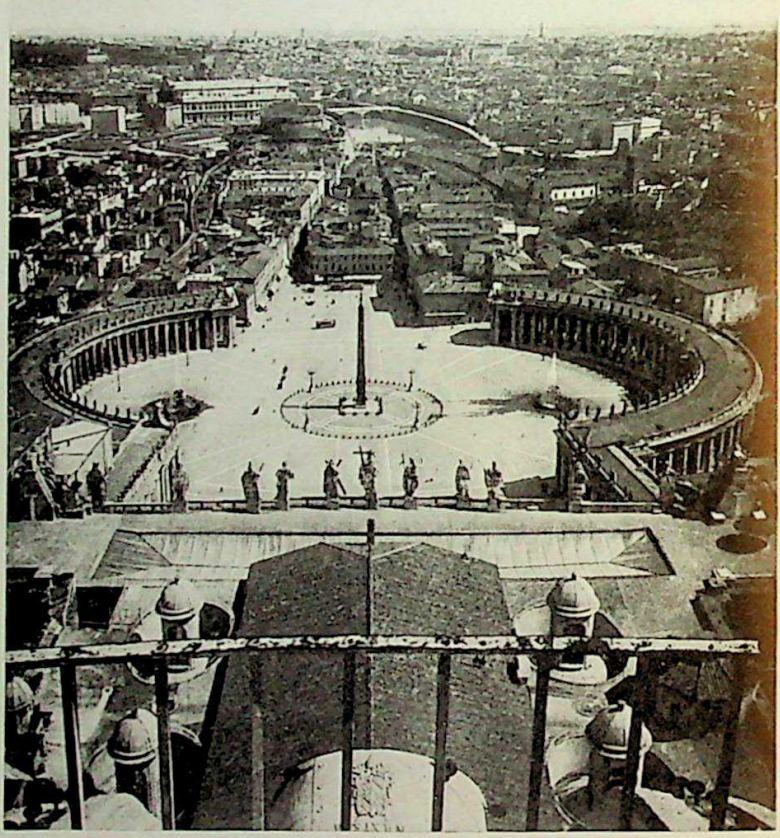
HOLLAND

Population is about 5,700,000. Holland is a country of large wealth and many industries. Among the products of the latter the Dutch cocoa, chocolate, linens and damask are known and dealt in all over the civilized world. Amsterdam is the headquarters of the diamond-cutting industry.

Up to a recent date Holland had no patent law. Now, however, full protection can be had, and the country, with its extensive commerce and manufacturing interests, is well worth attention.

The cost of a Dutch patent with a single sheet of drawings, paid up to the end of the first year, is $90. The term is 15 years, with an increasing tax after the first year.





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ROME, THE ETERNAL CITY, FROM THE DOME OF ST. PETER'S.

ITALY

Southern Italy (Calabria and Sicily) is almost wholly agricultural and unprogressive. Northern Italy has large cities, extensive and valuable water power sites, and its manufacturing output is considerable and increasing yearly. Among its manufactured products are woolen, cotton, silk and linen yarns and fabrics, furniture, chemicals, machinery for agricultural and other purposes and artistic work in mosaics, pottery and glass. This part of Italy has had a considerable foreign commerce since the early part of the 13th century and still has large shipping interests. Genoa is the principal seaport in the north and Naples in the south. The population of Italy is 34,000,000. It is a good field for American inventors and is growing better all the time.

The most important natural products are iron, borax, marble of fine quality, salt, nitre, alum, alabaster and gypsum, and in the arts relating to plastics Italy is in the front rank of progress. Inventions relating to molding or producing plastic figures, works of art, or bas reliefs, are of great interest to the commercial and industrial classes of Italy. Table delicacies, wines, olives, olive oil, fruits, silk, cotton, straw hats, leather goods, perfumes, toilet requisites, and many small articles of utility, are produced in growing volumes, and inventions of merit having for their objects the production of articles from or the treatment of materials for the improvement of quality, are eagerly sought for. The mineral and thermal springs of Italy are almost innumerable, and many salt lagoons fringe the coasts of Venetia and Tuscany, employing thousands in packing, handling, shipping and storing the products. The paper product furnishes an extensive source of revenue and the trade in this staple has increased to enormous proportions. American inventions are needed in such countries as Italy, where progress depends largely upon the introduction of modern machinery and methods to develop resources, and we will not be long in taking advantage of such chances.

The cost of a simple patent full paid to the end of the first year is $60. There is a small increasing tax after the first year.

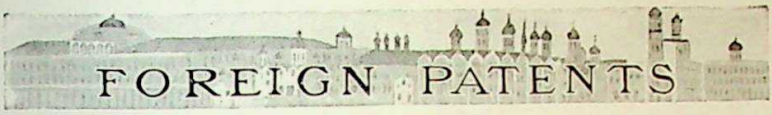
JAPAN

For many years after Japan was opened to western civilization in 1854 it had no patent law. Such a law would have retarded and penalized the rapid adoption of American and European industrial ideas which took place following the Japanese revolution of 1867. Later a patent law was enacted, but it protected only Japanese inventors. Foreign inventors were finally protected by the law of 1888 and subsequent acts, until to-day the American inventor has adequate and full protection. Infringement calls for fine and imprisonment as well as damages.

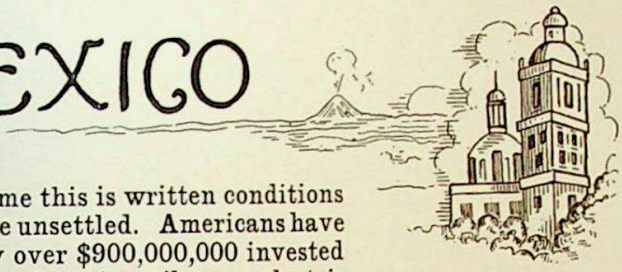
Japan is a very old country with modern ideas in industrial and commercial matters. It is the aim of her people to make Japan a great power in trade as well as politics. And they are doing it. They have shipbuilding plants, steel mills, cotton factories and machine shops that would be a credit to any nation and are far advanced in many of the useful arts. They need American inventions in many lines. Japan has a population of about 50,000,000.

The eyes of the world are on Japan. Its natural resources are almost unlimited, and its people are intelligent, progressive, and alive in grasping the main chance. The trade in silk products, paper, choice woods and articles made from them form the basis of a large home trade, while the shipments of such articles as camphor, copper, tea, japanned ware, decorated paper and fine fabrics and apparel have grown within the past few years to enormous proportions.

The cost of a Japanese patent paid to the end of the first year is $90. After that there is a small annual tax.

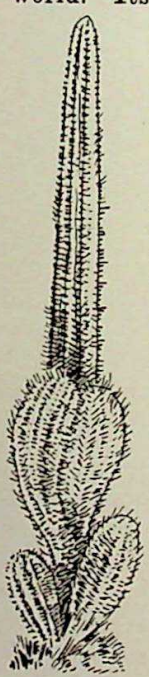


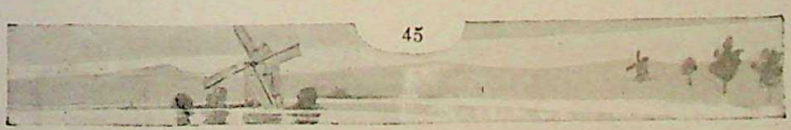
MEXICO



At the time this is written conditions in Mexico are unsettled. Americans have undoubtedly over $900,000,000 invested in Mexico, mainly in railways, electric light and power companies, mines, mills, ranches and plantations. That the disturbances have greatly impaired the value of these investments admits of no doubt. That Mexico will eventually pay the bill is practically certain. No matter which of the contending parties prevails, it can be safely stated that the rights of American patentees in Mexico will be respected.

Mexico forms one of the richest and most varied zones in the world. Its climate and soil are such that many of the products of the tropical, sub-tropical and the temperate zones are successfully grown. Valuable timber, dyewoods, cereals, medicinal drugs and spices are natural products of this versatile and peculiar combination of climate and soil, and it has been recently discovered that the cactus which grows in abundance in nearly all parts of this diversified country is a most valuable fertilizing agent for the soil. Machines for the treatment of this natural fertilizer should be supplied. The cost of the raw material is practically nil, and when ground, dried, and packed in bags or barrels, ready sale is assured, both in and out of Mexico. The silver mines of Mexico have long been a source of stable income, while iron, copper, lead, tin, quicksilver, alum and precious stones are natural products of this wonderful country. Where a country is rich in its natural products, the inventor is needed to supply the tools and machines for the treatment and handling of the materials. Let the American inventor know what is wanted in the way of an ingenious device for doing anything, and he will produce it, and make it go. The cost of a Mexican patent paid for twenty years is only $70.



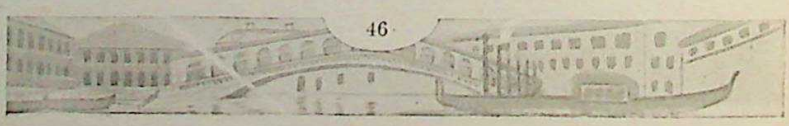


New Zealand has an area of 105,000 square miles, only 5,000 less than that of Italy, and a population of 1,000,000 against the 34,000,000 of Italy. It has room to grow and is growing. It is a highly prosperous colony. It is one of the four great gold-producing regions of the world. It feeds and houses its own population, and exports wool, meat, dairy products, tallow and lumber beside its gold. It has large deposits of copper and iron. Small as it is at present, it certainly deserves the attention of any inventor who has something really good in mining or farm machinery.

The cost of a patent for New Zealand is $60 with a tax at the end of the fourth year and at the end of the seventh year.

Norwegians have always been a shipbuilding and seafaring people since the earliest historic records of them, and these are still the leading industries of the country. In proportion to population, 2,400,000, it is probable that Norway has more ships and that more men sail under her flag than any other nation can boast. The fisheries are an important source of profit, cod and herring, cured, and fish oil being among the principal exports. Wood pulp is another export that runs into large figures. Shipbuilding is probably the most important industry conducted on land. Norway exports some butter and cheese, but the most of her farm products are consumed at home.

The cost of a Norwegian patent is $65, all fees paid up to the end of the first year. Thereafter there is a very moderate annually increasing tax. The term is 15 years.



In population, 158,000,000, Russia is second to China among the great nations of the earth. It is a great agricultural country, much of it being well adapted for farming on a large scale with modern machinery. A good deal is already being done in that way and more would be if it were not for the absurd system of land tenure in many parts of the country. Nevertheless, it is a good market for farm machinery. Manufacturing has increased greatly in the last twenty years. Mining is an important industry. Russia furnishes practically all the world's supply of platinum, a metal in high demand and worth at present two and one-fourth times as much as gold. Russia has, in Russia proper and her Asiatic possessions, the largest supply of coal and petroleum outside the United States. Russia has 46,000 miles of railway, with more under construction. It is well worth the consideration of a man who has made an invention of real merit, particularly in textile, metal working or farm machinery or in electrical or railway appliances. There is also a chance for many of the smaller devices for the household, office and farm. Russia is a big country.

One of the principal articles of internal commerce is wood. Oak, lime, maple and ash predominate, and the need for necessary machinery for utilizing the abundance of valuable woods is obvious. Mines, and the weaving of worsteds, flax, hemp, and woolen, at the immense factories in Moscow, give employment to multitudes, while the agricultural imports, such as sugar, grain, coffee, tea, dyestuffs, and wines, are sources of great revenue.

A Russian patent costs $85, paid up for one year. There are gradually increasing taxes after the first year.

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CADIZ AND ITS CATHEDRIAL, SPAIN.

Spain

Spain manufactures little beyond its national needs, though it has at least one large manufacturing city, which is also a seaport, Barcelona. It is rich in mineral wealth, only partially developed, though the famous Rio Tinto copper mines are probably the oldest in the world that have operated continually since they were opened. Farming is profitable in some parts of the country. If Spain has an industrial future it will probably be found in the great undeveloped mineral wealth of the country and in the manufacturing interests that grow out of it. It is by all means fertile ground for the American inventor.

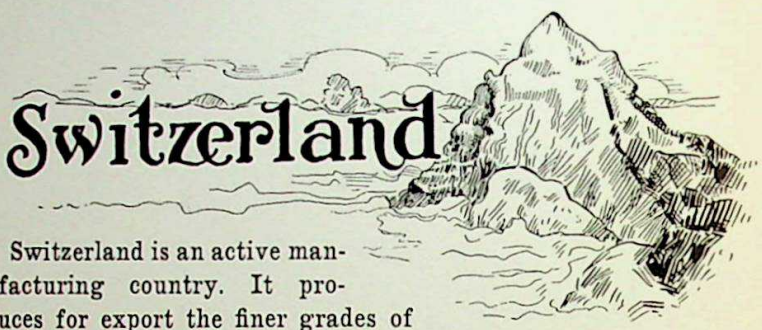
The term of a Spanish patent is 20 years. The cost, taxes paid to the end of the first year, is $65. There are increasing taxes after the first year.

Sweden

The population is 5,500,000. Agriculture is the leading industry, more than fifty per cent of the population being engaged in it. Swedish steel is of high quality. Razors, other cutlery and tools made from it rank with the best. The manufacture of watches is conducted on a very large scale.

Sweden is an enlightened and prosperous country, with the needs and requirements that go with a high civilization.

The cost of a Swedish patent paid up to the end of the first year is $70. There is a very moderate increasing tax after that.



Switzerland is an active manufacturing country. It produces for export the finer grades of silk, cotton and linen goods, machine embroideries, clocks, watches, leather goods and pottery, beside other manufactures. It also exports cheese, condensed milk, and other farm products in smaller quantities.

The cost of a Swiss patent is $65 paid up for the first year. After that a small increasing tax.

Other Foreign Countries.

We give below a partial list of other countries and colonies which are worth considering in the case of some inventions. Careful discrimination should be exercised as to the adaptability of the invention and the probable demand for it.

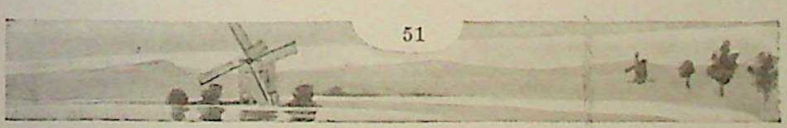
Bolivia, all taxes paid	$275
Cape Colony, taxes for 3 years	110
Ceylon, taxes for 4 years	120
Colombia, all taxes paid, 5-year patent	125
Colombia, all taxes paid, 10-year patent	160
Colombia, all taxes paid, 15-year patent	210
Costa Rica, all taxes paid	125
Ecuador, all taxes paid	200
Finland, taxes paid for 1 year	80
Guatemala, all taxes paid	200
Honduras, taxes paid for 3 years	150
India, taxes paid for 4 years	75

Nicaragua, taxes paid for 1 year	170
Panama, all taxes paid, 5-year patent	150
Panama, all taxes paid, 10-year patent	180
Panama, all taxes paid, 15-year patent	270
Paraguay, all taxes paid	320
Peru, all taxes paid	200
Philippines, registration of U. S. Patent	20
Porto Rico, registration of U. S. Patent	20
Portugal, taxes paid for 1 year	60
Roumania, taxes paid for 1 year	80
Salvador, all taxes paid	225
Turkey, taxes paid for 1 year	100
Venezuela, all taxes paid, 5-year patent	190
Venezuela, all taxes paid, 10-year patent	240
Venezuela, all taxes paid, 15-year patent	300

All charges quoted on foreign patents include translation up to 1,000 words. Our charges for additional translation are $1 per hundred words for German, French, Spanish, Swedish, Danish and Norwegian, and $2.50 per hundred words for other languages. We can furnish close estimates for other countries and colonies.

In applications for British patents and German full patents we do not undertake to refund fees if the application is rejected. The German Patent Office rejects some applications which would be allowed under the American practice. This does not, however, apply to the German "Model" or "Gebrauchmuster," patent hereinbefore described, on which we always refund our attorney's fee if the application is rejected.

Otherwise, and in whatever other country of the world an application is filed through us, we agree that, if it is finally rejected for any reason whatever, we will return all fees paid us for the preparation and prosecution of the case, said fees being exclusive of the foreign government fees, our foreign agents' fees and the cost of drawings, the amount returnable in each case being approximately $20.



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CITY OF NICE, FRANCE.

Foreign Trade Marks

If an American manufacturer has a "going" business and has entered, or expects or hopes to enter, the foreign field, the subject of foreign trade-mark protection, when it is understood, cannot fail to interest him. A registered trade-mark backed up by goods of a recognized and desirable quality is a valuable asset in foreign as well as home markets. The trade-marks "Vaseline" and "Royal Baking Powder" may be cited as two out of many instances in which goods of quality, absolutely unprotected by patents, obtained and have held an extensive home and foreign market. The market was obtained through the energy and business intelligence of the owners. It has been held and increased through the trade-marks, both of which have become household words. Wherever goods are sold, or are intended to be sold, in a foreign country under a distinctive name or mark, the advisability of registering that name or mark in such foreign country cannot be questioned.

Nearly every important country in the world has within the last ten years reformed and simplified its laws for the registration of trade-marks, our own practice having been greatly improved by the Act of 1905. South American countries, which formerly gave practically no protection at all, now provide for the seizure of goods bearing the infringing trade-mark, if it has been duly registered, and for the punishment of the infringer. The same is true of many European countries. This is a marked change for the better. Only a few years ago axes and machetes of greatly inferior quality were widely sold by European firms in the South American market under well-known American trade-marks. This could not happen under the present laws if the trade-marks were duly registered in the country importing the goods. Registration of the trade-mark here, coupled with business ability, helps the manufacturer or dealer here to get a

foothold in foreign markets and registration of the foreign trade-mark, and his own maintenance of the standard of his goods holds it for him. That is the meat of the matter. The time was when we exported grain, beef and hog products to the almost total exclusion of everything else. To-day there is an immense and yearly increasing exportation of manufactured goods. Every manufacturer whose goods are fitted for a foreign market and who has any facilities for getting at that market is considering the foreign field. The registration of the trade-mark abroad is most important, but to make a success of foreign trade the merchant and manufacturer must take into consideration the importance of so packing and shipping his goods that they will be delivered in good condition. The accepted terms of credit and banking facilities of the importing country must also have due consideration. It enables the merchant or manufacturer to hold his trade when he gets it. No live business man in foreign trade, or seeking or expecting to enter it, can afford to disregard the advantages offered him by foreign trade-mark laws.

It is always advisable to apply for foreign registry of a trade-mark at the same time that the American application is applied for, or at least only a few days later. Actual registry in this country must precede registry abroad, but, in order to be certain in all cases of securing priority, foreign **APPLICATIONS** for registry should follow very closely upon the United States **APPLICATION.**

The exclusive right to the use of a common law unregistered trade mark that has been actually and exclusively used by the owner is recognized and upheld by the courts of this country and by those of the leading commercial nations of the world. But there are two great advantages in registering the mark, both in this country and abroad. Registry is itself **PRIMA FACIE** proof of the existence, ownership and use of the mark, saving difficulty and large expense in making proof of these facts in cases of infringement, and such infringement of a **REGISTERED** mark may be punished by the infliction of treble damages under our law or fine or imprisonment in most foreign countries.

FOREIGN PATENTS

What is Registrable as a Trade-Mark.

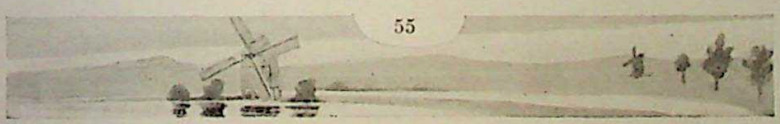
The laws of foreign countries relating to trade-marks are not absolutely uniform, but it may be stated generally that any word or words, picture, figure or monogram or other combination of letters, or any combination of any or all of these, is entitled to registry as a trade-mark, provided it is not descriptive in any way of the goods on which it is used or of the locality where they are made. The class of goods must be specified.

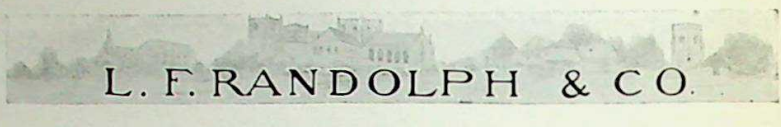
Charges for Trade-Mark Applications.

Below is a list of the more important countries in which trade-marks can be registered. There are many other countries and colonies in which registry can be had and in which it may be valuable in some lines of trade. On these points we are always glad to furnish information. The figures of cost given in the list cover all charges, including our attorney's fee.

EUROPE

Austria	$40.00
Belgium	40.00
Bulgaria	80.00
Denmark and Faroe Islands	50.00
Finland	45.00
France, Algeria, and all French Colonies	40.00
Germany and all her Colonies	45.00
Great Britain	50.00
Holland	45.00
Italy	50.00
Norway	45.00
Portugal, with Azores and Madeiras	45.00
Roumania	55.00
Russia	50.00





Servia	115.00
Spain	70.00
Sweden	50.00
Switzerland	40.00
Turkey	110.00

NORTH AMERICA

Canada	65.00
Mexico	45.00

WEST INDIES.

Cuba	55.00
Jamaica	70.00
Porto Rico, filing copy U. S. mark	20.00

SOUTH AMERICA.

Argentine Republic	65.00
Brazil	65.00
Chile	50.00
Ecuador	85.00
Panama	100.00
Paraguay	75.00
Peru	70.00
Venezuela	45.00

ASIA

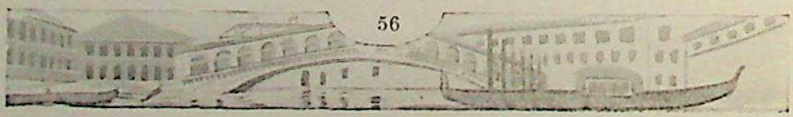
Ceylon	85.00
China	70.00
India (British)	40.00
Japan	60.00
Philippines	50.00

AFRICA.

Cape Colony	65.00
Egypt	55.00
Transvaal	70.00

AUSTRALASIA.

Commonwealth of Australia	55.00
New Zealand	40.00



DESIGN PATENTS

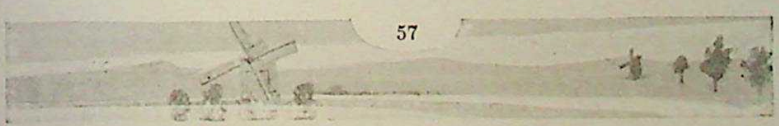
Foreign

Foreign design patents, like the "Model" patents of the German law, already mentioned, are intended to cover less important inventions which have some novelty in construction or arrangement, but for which valid mechanical patents cannot be obtained. The cost, covering all charges, and the time, for leading countries, is given below.

Austria, term 3 years	$35.00
Belgium, term 1 year	30.00
Belgium, term 3 years	35.00
Belgium, term 5 years	40.00
France, term 1 year	30.00
France, term 3 years	35.00
France, term 5 years	40.00
Germany, term 3 years	35.00
Great Britain, term 5 years	35.00
Hungary, term 5 years	40.00
Italy, term 2 years	40.00
Portugal, term 5 years	40.00
Russia, term 10 years	50.00
Switzerland, term 15 years	40.00
Cape Colony, term 5 years	50.00
India, term 5 years	45.00
Japan, term 3 years	60.00
Mexico, term 5 years	40.00
Spain, term 20 years	40.00

United States Design Patents

Design patents in the United States are confined to decorative or ornamental ideas or features and do not cover mechanical



devices. Section 4929, Revised Statutes, states that "any new, original and ornamental design for an article of manufacture" shall be the proper subject for protection by design patent in the United States.

This is held to cover any original shape or configuration of the article itself, and any original pattern, print, or picture intended to be printed, painted, etched or moulded upon or in the goods or article; provided that the purpose of the design is clearly ornamental, the extent to which it actually is so being immaterial, that being a matter of taste and not of law. The law is broad and liberal and is liberally construed and applied in the Patent Office and by the courts.

A design patent can be secured for the pattern of a machine or article of manufacture, if ornamental, whether a mechanical patent is or ever can be obtained for it or not, and such a patent frequently affords a valuable additional protection to a mechanically patented device or article.

In many cases it is advisable for this reason to take out a patent for the design of an invention otherwise patentable; and if an unpatentable article is to be put on the market in a special form or with a special design stamped or moulded on it, and in considerable quantities, a design patent should always be obtained if possible. In some cases, especially when shape, form or some peculiarity of design is largely relied upon to sell the article, the design patent may be the best form of protection. More than one business success has been built on a design patent.

Design patents are granted in the United States for three and one-half years at a total cost of $45, including our fees, for seven years at a total cost of $50, and for fourteen years at a total cost of $65. The applicant must make his election as to which term he applies for. After grant of the patent for three and one-half or seven years it will not be extended.

COPYRIGHTS

Foreign

Copyrights for works of literature, art or ornament are granted by the most important foreign countries. But the right must be protected by registration or the author or composer runs the risk of losing his priority. Foreign laws are, for the most part, quite liberal, even more so than those of the United States. No author or composer or creator of an important work of art should neglect to protect his rights by registration of copyright in all the countries in which it is likely to be used or copied.

There is an international copyright union which comprises most of the European powers as well as Japan. A person registering in one of these countries has all the rights and privileges which the laws of the other countries grant to their own citizens. The United States is not a member of this international union.

The cost of a British copyright is $35. To obtain copyright protection in Great Britain where publication is to be made in the United States the first publication must be made on British territory. It is usual to arrange for a simultaneous publication in this country and Great Britain. The laws of foreign countries differ somewhat as to methods of publication. We can supply any information that may be required in the case of any country where registration is advisable.

A British patent covers nothing but Great Britain itself. A British copyright, however, covers all British colonies except Canada.

Among other countries which register copyrights are the following:

Austria	$40.00
Hungary	35.00
Germany	40.00
France	40.00

Belgium	50.00
Spain	40.00
Holland	55.00
Switzerland	45.00
Turkey	65.00
Japan	60.00

In these different countries the copyright has different terms, ranging from 50 years to the life of the author and 50 years after his death.

United States Copyrights.

These are granted for literary, dramatic or musical compositions, paintings, statuary and a variety of other objects. No protection can be obtained through copyright for any thing or article that has a merely commercial or industrial value. If a thing or article has a use in any of the trades it should be, if it is novel, protected by a patent. It is not the intention of the law to permit an inventor to protect any sort of mechanical invention by copyright. The title or description of the article upon which copyright is sought must be filed with the Librarian of Congress on or before the date of publication and two copies of the book or article must be delivered to the Librarian not later than the day of publication. The total cost of copyright, including all fees, is $5.

The first step in securing protection by United States copyright registration is the publication of the article to be copyrighted with a notice of copyright. The notice may consist of the word copyright, the year, and the name of the claimant, or the word copyright may be abbreviated "Copr.," and in the case of a work of art, photograph, or print, the notice may consist of the capital letter C surrounded by a circle accompanied by the name of the proprietor of the copyright. After publication —that is, placing it on sale—the protection of the article may be completed by filing the application for registration. We will attend to the registration on receipt of the fee above stated and two copies of the article to be protected.

MONEY ACROSS THE SEA

If an invention can be sold in the United States, it can be sold in other parts of the world. It is for this reason that it is almost as important for an inventor to secure a patent on his device in foreign countries as in this country. If he does not do this, he sacrifices thousands upon thousands of dollars because foreigners, once they realize the value of the invention, will seize upon it and sell it as their own if it is not protected by the patent laws of their countries.

One of the biggest manufacturing men in Germany had this to say recently:

"Americans are the kings of invention. And, because they surpass in this line of mental activity, the countries of Europe are paying them hundreds of thousands of dollars every year. There was a time when your inventors patented their ideas in the United States but neglected to take out patents in foreign countries. The result was that they were robbed in some instances of half of the fortunes they would have made. This was because foreigners, learning of the inventions, patented them under their own names and manufactured and sold them.

"Nowadays, however, the American inventor has learned his lesson from experiences of his less fortunate brothers. My experience in the manufacturing business has taught me that practically every American inventor who has a device which can be sold is wise enough to apply for patents in foreign countries at the same time that he applies for his patent at

home. This explains why we Europeans are paying out such tremendous sums as our tribute to the inventive power of your people. Indeed, it would be folly for an American inventor not to patent his article in foreign countries, because the people of Europe are particularly quick to recognize the advantages of your inventions, and a ready sale for them is found easily."

This man knew whereof he spoke. In his own business he had discovered that Americans could and did make enormous sums of money by the simple and economical precaution of patenting their ideas abroad. In one year, according to the official records, 2,819 patents were taken out in Great Britain alone by American inventors. This means that there are approximately 3,000 articles invented in America every year which can be manufactured or sold in Great Britain at a profit—and they must be patented by Americans if Americans are to reap the profits.

In Germany a compound consisting in large part of phenacetine has made a big fortune for an American inventor. The inventors and manufacturers of sewing machines are being enriched every day in the year because the housewives of Europe prefer to do their sewing on the machines which have been designed by citizens of the United States. Square mile after square mile of land is sown and harvested by American-made machinery because this line of agricultural implements surpasses any invented in Europe. And thus the list could be run out indefinitely.

This does not mean that an article which sells in the United States will sell necessarily in every country in Europe. For instance, there would be precious little demand for an improved electric fan in the northern part of Russia, and the inhabitants of Venice would not listen attentively to a proposition to sell them ice-boats. In applying for patents abroad, the inventor and his attorney must take into account the exigencies and conditions of climate and environment in the various parts of the continent. And it can be adopted as an unfailing rule that, wherever the climate and environment permit, those things

which sell in America will sell in Europe, Australia or China and Japan.

Here are a few of the American inventions which have made fortunes by their sales in foreign countries alone:

The telephone.

The sewing machine.

The phonograph and talking machine.

Harvesting machinery of every kind.

Improved apparatus to be used in mining operations (some of the diamond mines of South Africa are paying big money to American inventors).

Improvements in locomotives.

Hooks-and-eyes.

A device for making medallions out of lava that is still hot from eruptions from volcanoes.

Machinery for crushing the juice out of tropical fibrous plants for medicinal purposes.

Many improvements for automobiles and motor boats.

And here are some of the things which, if invented, would find a ready sale in many parts of Europe and the remainder of the world:

Safety devices of all sorts for railroad travelling.

Apparatus for extinguishing fires on vessels.

Labor-saving devices, because Europe has awakened only in the last few years to the tremendous industrial importance of machines over hand labor.

Ingenious games for children and puzzles for adults.

Improvements in trawl nets for coast-wise fishing.

New implements or methods for excavation work in crowded cities.

Perfecting moving pictures.

Improvements in refrigeration in all hot countries.

A reliable way of refrigeration through the vacuum process.

New musical instruments, and devices for improving the efficiency of the instruments now used.

As this firm receives many letters from the manufacturers of this country asking for new inventions, new devices to be made and put on the market, it also receives from foreigners inquiries of the same sort. The truth of the matter is that American ingenuity is regarded so highly abroad that in many cases it is easier to persuade foreigners to finance manufacturing undertakings than it is to obtain such aid in this country. The preeminence of the American inventor has become established. The word "American" is a guarantee of good sense and efficiency. Consequently, all that the inventor of today has to do is to cash in on the reputation his fellow citizens have made.

The manufacturer quoted at the beginning of this article had this to say:

"I believe that among a few Americans there is a mistaken impression that Europeans are not willing to spend their money for improvements and new things. This is altogether a mistake. A glance at the per capita savings of such countries as France and Germany will convince anybody that this view is erroneous. The European public is always particularly anxious to find anything that contributes to its comfort, its amusement or its entertainment. Devices and contrivances which do any of these things are sure of a ready market. It is the old story that any inventor who can produce something useful or something amusing has the world as his market."

These statements are borne out by the millions of dollars that have come across the seas to such men as Goodyear, Edison, Morse, Eli Whitney, Alexander Graham Bell and Richard M. Hoe, not to mention George Westinghouse, Linus Yale, Jr., Elias Howe, and Thaddeus Fairbanks. The bank accounts of these men and the corporations which they have founded prove beyond the shadow of a doubt that Europe, no less than America, is willing to pour a golden stream into the pockets of those who can give the world those things which are beneficial and useful.

There is a mistaken impression that the cost of securing patents in foreign countries prohibits the average inventor from undertaking such a course. Moreover, there are many inventors who, being uninformed on the subject, believe that the process is too involved and takes up entirely too much time. All these things

are mistakes. The cost of the foreign patents compares favorably with the cost of American patents—and it is trivial when it is remembered that such a slight expenditure may prevent other men from stealing hundreds of thousands of dollars which rightfully may belong to you.

Nor is it an involved procedure. It need give the inventor no trouble at all. Naturally, this firm has its agents and correspondents in all foreign countries. We are in constant communication with them. They are thoroughly versed in the patent laws of their countries, and they are as close to the patent offices of their governments as we are to the Patent Office in Washington. When once we have learned all the smallest details and requirements of the American patent, we have at hand all the information and documents which the foreign attorneys will need for their use in prosecuting patent claims before their governments. The patent office business is well organized in nearly every country, as it is in the United States. Men familiar with its operation can handle a patent on the information, data and facts which we are enabled to send to them after studying the patent in this country.

Of course, the only way for an American inventor to take out a patent abroad is to act on the advice and with the assistance of the attorneys who have handled his patent in America. He would waste a vast amount of time and a great deal of money if he attempted to manage what would be to him a great problem but what is to a well-established patent law firm a matter of detail and of urging expeditious action. This is one thing which we have impressed on our correspondents and representatives in all the capitals of the world—we insist that all the claims of our clients shall receive immediate attention. In the patent business promptness is one of the great essentials, and we feel confident that we have built up a patent system reaching around the world which will insure any inventor against a foreigner stealing his ideas or his profits.

It is almost a superfluous matter to discuss with inventors the advantage of protecting by patents abroad as well as at home

the outputs of their brains. The inventor who desires to get all the American money possible for his device desires also to get all the profits possible from other lands. And, in this connection, he will want advice as to how to market what he has invented, how to put it into the hands of manufacturers and purchasers, and how to have it properly financed. If such suggestions are wanted, our firm's correspondents will be in a position to make them. Naturally, they are familiar with the various ideas and devices sought after by the manufacturers and promoters of their particular countries, and this knowledge on their part is at our disposal, just as any knowledge which we may have along the same lines regarding this country is at your disposal.

In other words, our object has been to make our foreign agents as serviceable to the inventor in the capitals of the world as we strive to be in the United States. When all is said and done, the patent business is the same the world over. The public seeks always for a new idea, something to fill its long-felt wants, something to improve it or uplift it or entertain it. And, as this firm studies and analyzes these demands here, the attorneys and firms representing us abroad study the similar demands in their countries.

The reports from our agents and the statements of people who have traveled abroad extensively bear out absolutely what has been said in this article. Europe and other foreign lands are full of machinery, devices and apparatus invented by Americans. Yankee ingenuity spreads its banners in every clime and before every breeze. But it is seldom, indeed, that in this country any valuable device has been originated abroad. And this fact is not impressed on the American mind alone. It is recognized and admitted by the foreigners themselves. This is the reason that they are looking constantly for the new ideas and the new products which spring incessantly from the brains of our citizens.

The world is willing to pay its millions to the men who can give it the inventions it wants. It only remains for Americans to patent their inventions here and abroad. This is the only way in which they can be sure that they, they alone, will receive all the wealth that can be produced by their inventions.

HON. JOHN WHARTON CLARK, OF OUR LEGAL STAFF, AT HIS DESK.

INVENTING AS A BUSINESS

It Can Be "Learned" Like Any Other Vocation.—Thousands Might Become Successful if They Would Only Cultivate Their Ideas.—Only Five Hundred Real Inventors in the World.

By RICHARDSON DAVENPORT.

From the Railroad Man's Magazine, published by The Frank A. Munsey Company, New York

INVENTION is a form of creation. When mechanics were in their infancy, accidental discoveries brought about great things. The modern inventor does not invent. He evolves. He ascertains what is wanted and begins with one fundamental mechanical principle. From this he works out the machine. It is like solving a problem in mathematics.

The complicated machinery of modern business has made inventing a profession. Thomas A. Edison, who is a combination of creative genius and the mathematical mechanic, says that inventing can be "learned" almost as successfully as any vocation. Thousands of men, he thinks, might become inventors if they would cultivate their ideas. He believes that the creative germ is dormant in most minds, and that it can be developed if the person has ambition, energy and imagination.

He says, further, that there is a great advantage in having ordinary shop experience and in acquiring an actual personal knowledge of how things are done. He believes that the abnormal person is never likely to become a commercial inventor. The first thing to consider is whether the public wants the invention and its commercial value. It must be absolutely

practicable, so that any one who needs it will buy it. Otherwise it is largely a waste of time.

"If a man is a good inventor," says Mr. Edison, "his chief inspiration is to make his invention earn money to permit him to indulge in more inventions. If he is a one-idea inventor, the incentive is generally money only."

The exigencies of modern industry have produced two types of inventor. One is the individual who maintains himself by producing one marketable invention after another. The other is the man who is a part of the inventive brain of a great business, a unit in the "inventions department" of some big industry. Nearly every large manufacturing company to-day has its "idea factory," in which from half a dozen to several hundred men are employed on salary to develop or create new devices.

Popularity of the "Idea Factory."

Mr. Edison is the best known example of the independent inventor, but he pursues the same methods that are followed in the great plants. He stated recently that there were, perhaps, only 500 real inventors in the world—men with scientific training and imagination. These men have made about ninety-five per cent of real modern inventions and improvements. They are usually connected with some great industrial enterprise and are practically unknown, but year after year they evolve all kinds of new machines and processes.

The inventions department of a factory is closely guarded. It may occupy much room, or to the eyes of an outsider it may appear as uninteresting as an ordinary machine shop. The men receive salaries ranging from $2,000 to $12,000 a year, and in a few rare cases much more. They are supplied with scientific and mechanical appliances to facilitate their work; the bills are paid by the company, and every invention is assigned to the company.

One Firm Gets 2,000 Ideas a Year.

The General Electric Company, at Schenectady, New York, employs about 1,000 men who devote much of their time to

developing new ideas. It spends more than $3,000,000 a year for this. The Westinghouse companies do the same thing; so does every progressive manufacturing concern of any consequence in the United States.

It is these unknown men, grappling with the every-day, practical problems of great manufacturers, who make most of the inventions of immediate commercial value. The National Cash Register Company, the Hoe Printing Press Company, the American Telephone and Telegraph Company, and some of the great railroad systems, each have inventive men creating and developing new devices that it may take years to perfect before the public sees them.

In the General Electric Company's employ there are nearly one hundred engineers at the head of various departments. It is a part of the routine duty of each of these men to watch closely the needs of his department and to see that such improvements are made as are necessary to meet competition or to supply new demand.

The thousands of employees are urged to suggest any idea which may occur to them. If the idea is practicable it is bought. About 2,000 ideas are brought to the management each year. Half of these, on investigation, are found to be either impractical or not new. The remainder are developed. More than 500 patents are annually taken out by the company, every one of them for a device of immediate commercial value. In that branch of the legal department which is concerned in the patent business nearly fifty lawyers are employed.

Scores of Chemists.

The General Electric Company's biggest man in its inventions department is Charles P. Steinnetz, its chief consulting engineer. He is one of the world's greatest scientific and inventive geniuses, and is reputed to receive a princely salary for his work as chief adviser of the company in the practical development of inventions.

The General Electric Company also maintains a laboratory of scientific research, in which are made experiments that will have no commercial value for fifteen or twenty years. The scores of experts in this department are mostly chemists. They spend their time in pursuing investigations into the unexplored regions of science, and are called on frequently to supplement the work of the engineers when mechanics and pure science meet.

In the great Westinghouse plant in Pittsburgh the inventions department is almost as large as that of the General Electric Company. In it was evolved not long ago, for the United States navy, a geared turbine which is a vast advance on present turbines and the first of its kind in the world. The turbine has been regarded as extravagant in the consumption of steam. This new creation of the brain of George Westinghouse consumes less fuel, steam, and water than a reciprocating engine that develops similar power. It also weighs less per horse-power and occupies less space.

From the Westinghouse department also have come the huge dynamos that made the harnessing of Niagara possible, a perfection of the air spring, a new type of engine, and giant electrical locomotives for the railways.

The Consulting Engineer's Duties.

The inventors of a great railroad are widely scattered and of a somewhat different type from that of a large manufacturing concern. In each of the departments connected with the physical progress and upkeep of the railroad is a consulting engineer, who sometimes has several assistants.

These consulting engineers are often great inventors or creators, and the most eminent of them are the real pillars that uphold the thrones of the railway kings. Probably they have done more than any other class of men to bring the American railways up to their high standard.

Stephen Dudley Field, who died in the early part of this year, was one of these comparatively obscure men who have

done much to make the last half-century the greatest of all eras in the progress of the world. The story of his achievements may be read in the United States Patent Office—the trolley-car, the quadruplex telegraph, the electric elevator, the long-distance telephone, and a score of other things.

He invented the first electrically propelled car that ever was built and proved practicable. He used what now is called the third-rail system, the device that has been employed in the electrification of many steam railroads and which is used on the New York subway and Elevated railroads. He was the first to suggest the use of a conduit for conveying the current by a rail under ground. This is employed by all the electrically operated surface street railroads on Manhattan Island.

Some Railway Specialists.

The name of Dudley is prominent in the science of transportation. Charles Benjamin Dudley is the famous consulting engineer of the Pennsylvania Railroad Company. Years ago he was installed as the head of a great laboratory in the workshops at Altoona. His work has been mostly in perfecting the qualities of iron and steel used in rails, bridges, cars, car-wheels, and everything that enters into railway construction. He is one of the world's greatest railway chemists.

Dr. Plimmon H. Dudley is the New York Central's consulting engineer of rails, tires, and structural steel. He is the "father of the mile-a-minute train." By his inventions and exhaustive studies of track and steel and by his devising a new and heavier rail-section he has enabled the railroads of America and of the world to more than double the speed and weight of all their trains. He has made railroad travel twice as safe as it was when he began his researches.

Connected with the Northern Pacific Railroad is a young man named Alfred Beamer. He has not the title of consulting engineer, but he has invented what is regarded by railway managers as the most important device in train operation that has yet been

perfected, excepting, of course, the expensive block-signal system. It practically eliminates the chances of collision.

Beamer's system of block-signaling by telegraph without the installation of signal towers practically makes each operator along the line a signalman. Telegrams are interchanged in such a way that each station is the end of a block and sets signals accordingly for the movement of trains. An essential feature of this system is the use of order-cards. These cards are in duplicate, one for the conductor and one for the engineer. The cards contain the information which the operator has received from the next station beyond in either direction.

These order-cards are placed in an apparatus something like that used for taking up mail on an express train. An engineer approaching a station finds a block signal set so that he can go ahead. He also has his eye upon the catch-card apparatus, and as his engine passes it he snatches the cards from the hook. They give him all the information he needs. They tell him what sidings to take, if any. By means of them he knows the location of every train in the block ahead and the block behind him.

Another man whose expert knowledge has made him a power behind the railroad thrones is George Gibbs, who is one of the consulting engineers of the inventions department on the Pennsylvania Railroad. He perfected the system of electric traction by which that line enters New York City through its Hudson River tubes.

Perfecting Electric Traction.

The most difficult feature of the electrification of railroads in their approaches to big cities is the establishment of electric switches and the economical distribution of electrical energy, so that the very heavy electric motors can be operated with perfect safety. This is Mr. Gibbs' specialty, and he and his staff have many inventions to their credit.

Dr. Frederick Millener is the electrical head of the Union Pacific at Omaha. He has done wonders in the field of wireless

telegraphy. He was the first man to control a car by wireless; his system of wireless signals is being established on that road, and out of his laboratory—which is one of the best equipped in the world—the wireless telegraph and the wireless telephone for the despatching of railroad trains is being evolved.

Dr. Millener started life as a doctor of medicine. He spent all he made in experimenting with the X-ray. He was severely burned in the course of his researches and lay ill in a hospital in Buffalo for many weeks. When he recovered his practice was gone and he was penniless. Finally he went to Omaha and began work with the Union Pacific as a common laborer at 17½ cents an hour. His ability as an electrician was soon evident, and it was not long before his inventive skill was recognized.

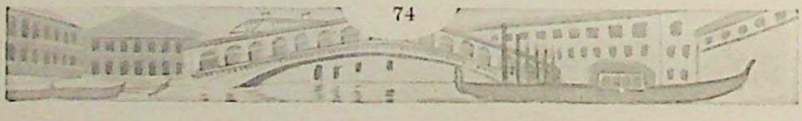
Finally he was put in charge of a large laboratory and was given the problem of making a wireless signal that would operate in the cab of a locomotive or on the train. He has succeeded in this so far that his system is in operation upon several hundred miles of the Union Pacific.

At present he is working on a system of wireless telephony and telegraphy to be used on moving trains.

Improving Iron and Steel.

The United States produces nearly one-half the world's total production of pig iron and of steel. The steel-mills of America are the biggest and most perfectly equipped in the world. So rapid are the improvements in the steel industry that a mill becomes practically obsolete in about five years.

Every steel manufacturing concern has a big laboratory and inventions department, in which many scientists and mechanical experts are employed. Every year one or more notable inventions for promoting economy in the manufacture of steel is given to the world by these men. Some of them, like James Gayley, former vice-president of the United States Steel Corporation, have achieved wealth and position through their inventions. While Mr. Gayley was superintendent of the blast



furnaces in one of the plants of the Carnegie Steel Company he worked for a long time to devise superior and more economical methods of manufacture.

What is known as the Gayley process was one of the epoch-making things he achieved. It cheapened the cost of manufacture twenty per cent. The basic idea was simple. Air is used in maintaining combustion in a blast-furnace. Ordinary air contains often as much as seventy per cent of moisture. Gayley sought for some practical method of making the air absolutely dry before it was forced into the furnaces.

He tried many experiments and finally succeeded. He dried the air by freezing it. This is accomplished by passing the air through a series of refrigerators containing coils of pipe filled with a freezing mixture. The cold condenses the moisture on the pipes.

The combustible gases from the exhaust of the furnace are captured and used to heat this cold, dry air before it is used in the melting of the metal. The Gayley dry blast has saved many millions of dollars for the steel-workers.

Some forty years ago there was a man named Julian Kennedy, a champion oarsman. He, too, has done much to increase the output of America's blast-furnaces. Either as a consulting engineer or as an executive official he has been connected with many great steel plants. He is the author of many inventions, the most notable of which relate to blowing engines.

The Government's Inventors.

The total number of inventors and scientists in the employ of the United States Government is greater than those working for any private corporation. Many of these men, drawing salaries of a few thousand a year, have invented things worth millions of dollars. They have been given to the public.

There is an unwritten law to the effect that a man in government service who makes an invention must give it, without charge, for general use. The invention is patented, of course,

but the patent is turned over to the department by which the inventor is employed. Then the public is informed that it is at perfect liberty to make free use of the patent.

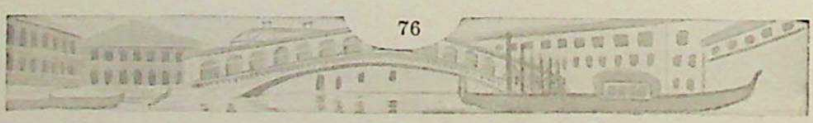
Last year F. G. Cottrell, a scientist of the Bureau of Mines, gave to the world a patent that promises to save many millions of dollars. It is a condenser that may be attached to the stack of any industrial plant and will take from the gases or fumes or smoke of that plant whatever may be escaping from them. If it is attached to a smelter in which copper and lead ore is being treated, but in which process the vaporized metals are escaping, they may be recovered and the ore may be made correspondingly more profitable.

The principle of this device is electrical polarization. The condensing appliance consists of sheets of iron or other metal some four inches apart, with electric wires bearing heavy currents half-way between them. Positives and negatives are set up between these plates and the particles of matter that are fastened to the tube. The escape matter is conducted through one portion of the apparatus until its plates have accumulated all the precipitate that they will carry, and then the current is switched through a different channel while the first plates are being cleaned.

Uses a Secret Ink.

In the Department of Agriculture Dr. Marion Dorset has invented a secret ink that is used by the Government in stamping meats which have been passed upon by the Government inspectors at the packing-houses. Prior to the use of this ink the Government was paying $60,000 a year for a tag that was patented by a private firm. Dr. Dorset's ink is not patented, as the Government desires its composition to remain a secret.

A very important part of the work of the U. S. Coast and Geodetic Survey is the forecasting of tides and the making of charts according to those forecasts. The computation of high tide or of low ebb for a given place is a very complex matter, nineteen different elements entering into the calculation.



Some thirty years ago William Farrel, an employe of the Coast and Geodetic Survey, devised a machine by which a single operator automatically produces these accurate calculations. This machine has taken the place of thirty computers, working throughout the year at an aggregate salary cost of $35,000. This machine has saved the Government nearly a million dollars since it was put into use.

In the Oil Industry.

One of the most remarkable inventors who has been in the service of great corporations is Herman Frasch. For many years he was the biggest figure in the Standard Oil Company's laboratory department. Probably no man in that big corporation did more than Frasch to increase its wealth. Men who know place the profitable return from one of his processes alone at more than half a billion dollars.

His first invention was a new process of refining paraffin wax. It brought him to the notice of the Standard Oil Company in Cleveland about thirty-five years ago. He sold it to the company and they gave him a place in their laboratory. Another profitable invention was a way to manufacture waxed paper, which became a very important by-product of the Standard Oil Company. He also invented an oil-lamp of superior lighting qualities and made many improvements in refining crude oil.

In the late eighties, however, he achieved a remarkable success. The great Ohio oil-fields had just been discovered. The Standard Oil Company had erected a huge refinery near Lima, Ohio, and the oil supply of America promised to be trebled. But it was found that the Ohio oil was so heavily charged with sulphur that it had a very offensive smell after it had been refined.

At that particular juncture Frasch was running a refinery of his own in Canada and was successfully handling crude oil that was as bad as the Lima product. The Standard Oil Company bought his refinery and he returned to their employ at a very

large salary. As quickly as his machinery and devices could be installed the refineries began to convert the Lima oil into as fine a product as that from Pennsylvania fields. What looked like a possible loss of a million or two was converted into a profit of several hundred million.

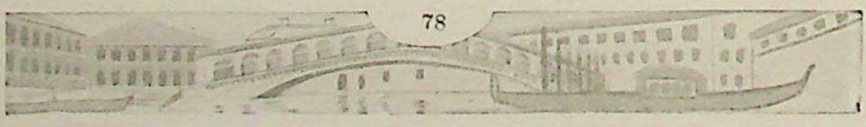
Frasch's most spectacular achievement occurred after he had ceased to give his services exclusively to the Standard Oil Company. On the Gulf coast to the west of New Orleans is a sulphur deposit about 300 feet thick, which begins 500 feet below the surface. It was almost impossible to sink a shaft down to the sulphur beds on account of the quicksand. Frasch became interested in this project and decided that the only way to bring the sulphur to the surface was to melt it where it lay and pump it up. Sulphur melts at about 235 degrees Fahrenheit. Frasch invented and patented an apparatus for superheating water to a very high temperature and forcing it into the sulphur beds through a six-inch tube inside of which was a three-inch pipe to bring the sulphur to the surface.

The plan worked perfectly and sulphur was produced on a tremendous scale, so that the American sulphur became a serious competitor of that from the Sicilian mines. It made Mr. Frasch a very rich man, but he still works unceasingly in his laboratory.

The Birth of Carborundum.

A man eight years in the employ of Thomas A. Edison has become one of the richest of the world's inventors through his researches in applied chemistry. His discoveries contribute, directly or indirectly, to almost every one's comfort. The scientist-inventor is Dr. Edward G. Acheson.

When he left the Edison "idea factory" his dream was to create an abrasive that would enable the manufacturer to meet the exacting requirements of an inventive age. He worked for years to combine the silica in sand and the carbon in coal to produce an abrasive purer than any ever known. He went to Niagara Falls and, with the aid of the tremendous electric



power generated there, produced the most intense heat known to man.

He fused his substances in the furnace, and prismatic crystals composed of pure corundum combined with carbon were the result. He called his new product "carborundum," by which name it is familiar to-day. It was so hard that it could cut the face of a finished diamond. At first it required two months to make a pound of it. This he brought to New York and sold for $432. Even at that price it was cheaper than diamond dust.

After this proof of the soundness of his theory it was not long before Dr. Acheson perfected his invention, so that carborundum could be produced cheaply and in vast quantities. His huge plant at Niagara Falls turns out millions of pounds of it every year. It is used in every machine shop all over the world.

But he was not satisfied with the stupendous work he had accomplished. He believed that new secrets remained undiscovered in his electric furnaces. In the great laboratories that he established he continued his experiments with a company of trained scientists and inventors and every device that money could purchase at his command. He discovered that under still more intense heat the carborundum would disintegrate and fall in flakes of graphite so soft that they would not scratch the highly burnished surface of the most carefully polished gold.

This graphite takes the place of natural graphite for almost all purposes and is much cheaper. The lead pencil tucked in your vest-pocket is made from it. The lubricant which makes an automobile run smoothly is another form. The paint upon your house and many other things in every-day use have this artificial graphite as one of their basic ingredients.

Aiding the Railroads.

In Denver some years ago the manager of the street railway company noticed that much time was lost in throwing the switch at a busy corner, where the traffic of the main artery of travel was divided on two tracks. Cars were stalled during rush

hours. One of his subordinates had an idea, and he was told to use every facility in the shops of the company for working it out.

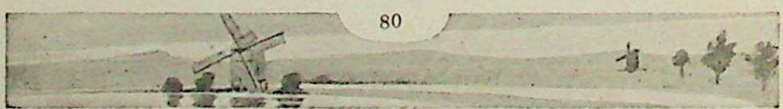
He invented an electric switch which could be operated by the motorman without leaving the car. It is in general use on electric roads to-day. If the switch is not set properly when the car approaches the motorman applies the brake. The extra resistance momentarily required draws the switch to the other side of the track and the car proceeds without stopping.

Up to a few years ago the middle wheels of six-wheeled locomotives were flat—without a flange. Manufacturers feared that it would cause the track to spread. A Western railroad manager had an idea that this theory was wrong, and ordered a locomotive with all wheels flanged. The new engine was placed in service to haul a heavy passenger-train over steep grades.

The trip was made more easily and less coal was consumed than ever had been possible before. This was because the flanged wheels increased the adhesion. There are no wheels without flanges on locomotives to-day, and the saving in coal alone has amounted to many millions of dollars, simply because this one man had the courage to test his idea.

Their scientific and mechanical training and the necessities of the work in which they are engaged make practical inventors of many men nowadays. There is a great demand for men who have methodically developed their creative ability. The great manufacturer no longer sits in his plant and waits for inventions to be brought to him. He seeks out the men who are capable, either of originating or carrying out the mechanical improvements that he must have in his business in order to keep abreast of his competitors.

The professional inventor is no longer the impecunious individual that he was half a century ago. If he has the necessary imagination and ability he can earn a fortune. The world is crying out for new devices and new conveniences, and there is endless reward for man's ingenuity.



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Yours respectfully,

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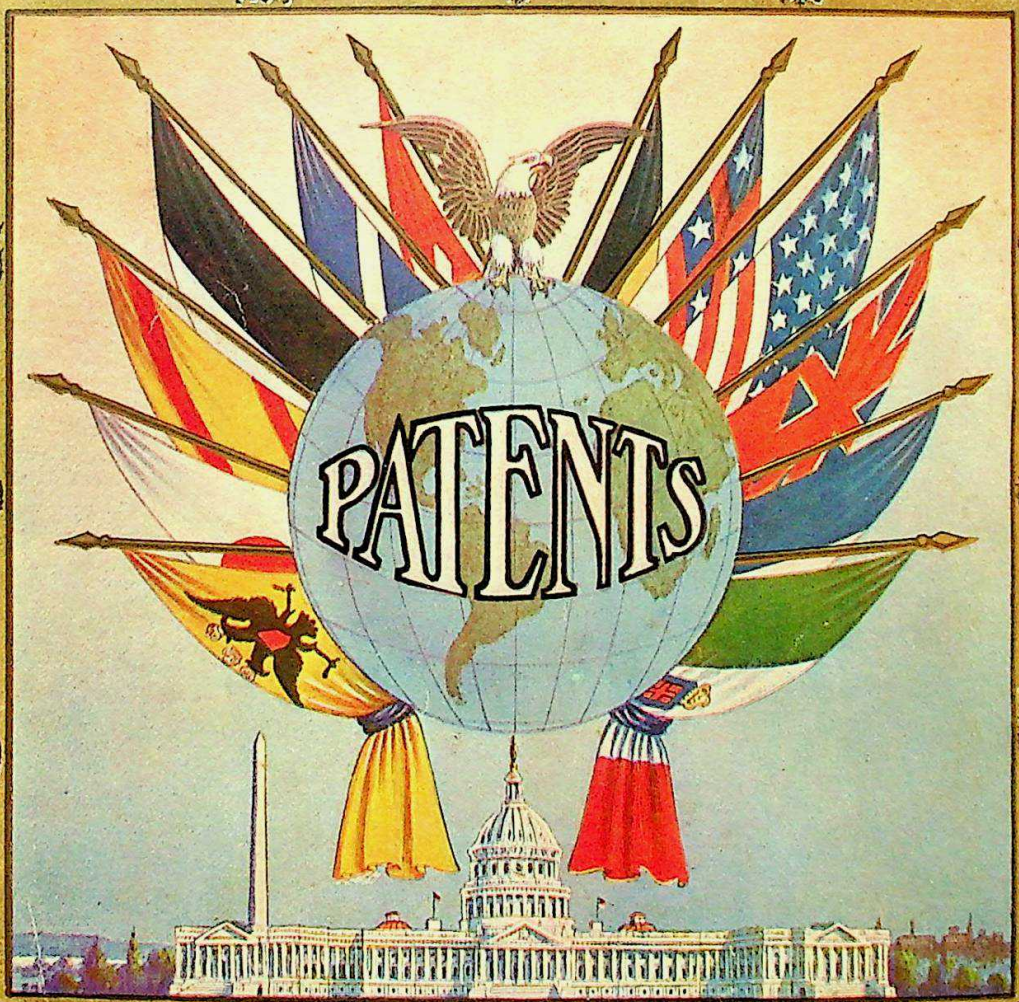

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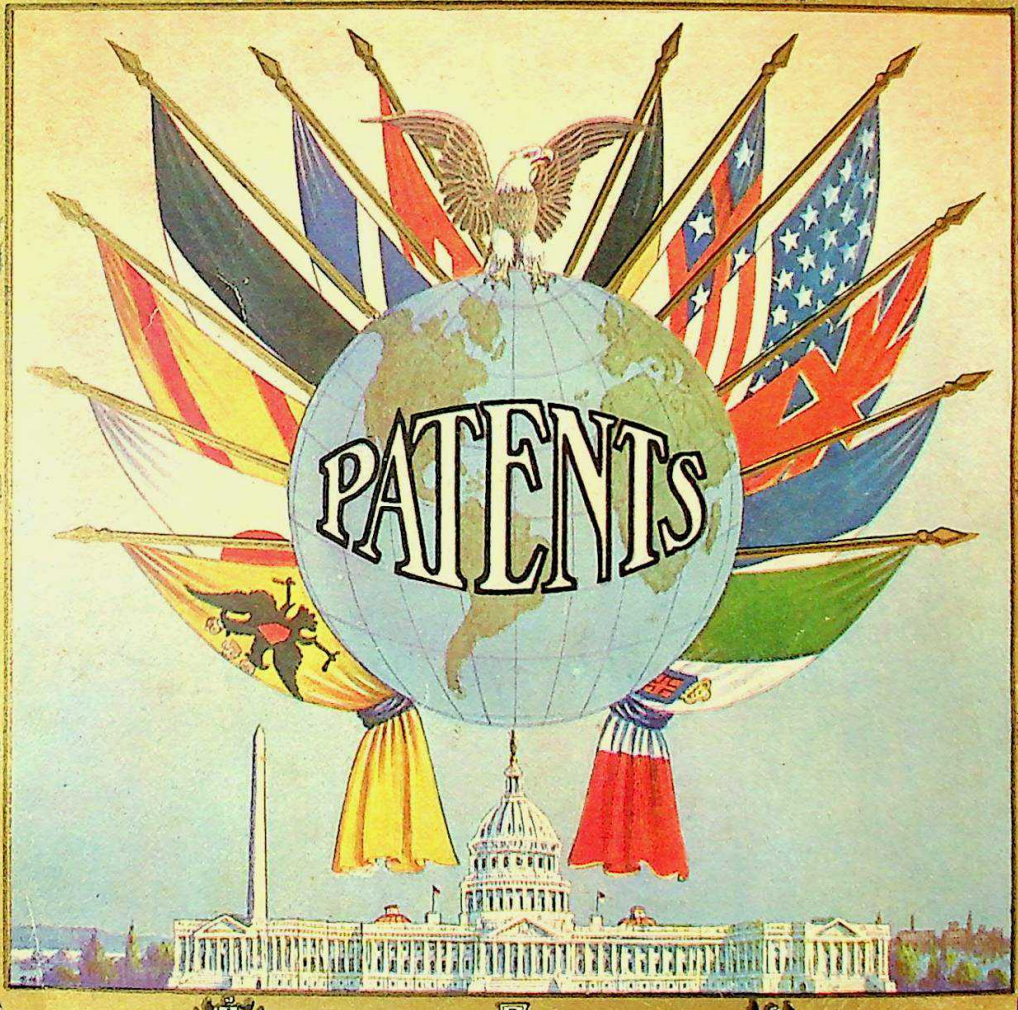

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